# Economic Costs of Dementia in Low and Middle Income Countries

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**Supervisors**

**Professor Paul McCrone**
**Dr Emiliano Albanese**

# Statement of the candidate's own personal share

In the project, the data analysis was based on the main database of the 10/66 dementia project conducted in seven countries.

I contributed to data collection in China from 2003 to 2005. Informed consent was obtained from participants, and in the case of incapacity a family member or carer gave agreement. The institutional review boards of the Institute of Psychiatry, King's College London (in London) and of the Institute of Mental Health, Peking University (in Beijing) approved the study protocol. A one-phase cross-sectional survey of all elderly (65 years and over) people residing in two defined catchment areas (the urban district of Xicheng in the heart of old Beijing close to Tiananmen square and the villages of Daxing, a rural district 20-50 kilometres from the centre of Beijing) was conducted. Community health doctors from the community health services in the two areas were trained by myself and my colleagues and then carried out the interviews applying the 10/66 standardised protocol, usually at the participants' households.

I conducted the analyses included in this thesis under the guidance of my supervisors (Professor Paul McCrone and Dr Emiliano Albanese). Professor Martin Prince led the overall 10/66 project and supervised my role in that study, but did not provide formal supervision of this thesis.

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# Abstract

The aim of the study is to assess the impact of dementia in low and middle income countries (LAMICs) on service and family costs and to assess the impact of dependency and other factors on costs.

A prevalence-based bottom up cost-of-illness study was carried out using the database of the 10/66 dementia project in seven LAMICs (11sites, n=15,022). The total cost was divided into cost of medical care, informal care and paid home care. The perspective of costs included both the public and private level. Cost of medical care at the private level was the out-of-pocket expenses. Health service use was valued according to country specific unit cost based on UK unit costs and WHO-CHOICE ratios. Cost of informal care at the private level was valued based on real salary loss and on average wages at the public level. Regression models were used to identify predictors of cost and attributable costs of dementia.

The results showed that the average total costs for people with dementia were I$1887 at the private level and I$6750 at the public level. At the public level, 94% of total costs were due to social care, and 90.4% of social care costs were due to informal care. Physical impairment and Behavioural and psychological symptoms of dementia (BPSD) led to higher costs of informal care, but not for medical care. Average attributable costs of dementia were I$5164, and were higher than for depression and other chronic diseases. Costs increased with dementia severity.

Estimates of total dementia costs are substantial and most of the care is due to support from unpaid family members. Interventions should be introduced both for dementia patients and their carers in the early stages of the condition dementia, so as to decrease the cost as well as improving quality of life.

# Section1. Background

## 1.1. What is dementia

Dementia is a severe loss of mental ability. The main symptoms of dementia include memory loss, impaired abstraction and planning, language and comprehension disturbances, poor judgment, impaired orientation ability, decreased attention and increased restlessness, behavioural changes, being passive depressed or anxious, having delusions, suspicion, paranoia, hallucinations or sleep disturbances. Not surprisingly, these problems usually interfere with normal activities of daily living. Dementia is not an inevitable part of aging, but the majority of patients are older people. In this thesis, the focus is on dementia which occurs in later life (65 years and over).

The cause of dementia is usually the degeneration in the cerebral cortex. This region in the brain is responsible for thoughts, memories, actions, and personality. The cognitive impairment is the result from death of brain cells in this region. When dementia is diagnosed the main symptom is memory loss, but should be accompanied by at least one other cognitive deficit, including aphasia (language), apraxia (tasks), agnosia (pattern recognition), or executive function (decisions/planning). All these should lead to functional decline in terms of activities of daily life (ADLs) and instrumental activities of daily life (IADLs). ADLs include dressing, bathing, personal care, finding their way around home, and eating. IADLs include working, shopping, cleaning the house, handling money, using the phone, driving, transportation, or maintaining the home. Behavioural and psychological symptoms of dementia also occur in some patients. Behavioural problems refer to agitation, screaming, restlessness, wandering, sexual disinhibition, hoarding, or cursing. Psychological symptoms include anxiety, depression, hallucinations, delusions and apathy.

Alzheimer's disease (AD) is the most common subtype and represents over 50% of all dementia cases. Evidence shows AD prevalence doubles every five years after 60 years old. Patients have different stages of cognitive impairment, function loss and

psychiatric problems. Vascular dementia (VD) is the second most common dementia, which usually follows stroke or transient ischemic attack (TIA). Some patients have urinary incontinence quite early in the course of VD and have focal neurologic signs or cognitive signs. Dementia with Lewy Bodies (DLB) is a further subtype of dementia. Patients usually have symptoms of Parkinsonism and visual hallucinations. Finally, there is frontotemporal dementia (FTD). Patients often have executive dysfunction, disinhibition and apathy. Some patients have mixed dementia, such as AD and VD.

## 1.2. Prevalence of dementia

The prevalence of dementia is difficult to determine. This is because of the differences in definition and methodology used in different studies. Another reason is that there is often normal decline in functional ability with age. Current studies of the prevalence of dementia show that there are clear differences between areas. Recently, a study (Ferri et al., 2005) assessed the global prevalence of dementia using a Delphi method and results showed that the prevalence ranged from 1.6% in Africa to 6.4% in North America among people aged 65 years and over. The population based study carried out by the 10/66 Research Group (on which this thesis is based) found differences between seven low and middle income countries (LAMICs). According to the definition and criteria of DSM-IV, among people aged 65 years and over the prevalence was less than 1% in India and rural Peru, while it was 6.3% in Cuba (Llibre Rodriguez et al., 2008). The 10/66 study also indicated that the prevalence might be underestimated because of underreporting by relatives.

Many investigations have indicated that the prevalence in high income countries is higher than that in LAMIC (Fratiglioni et al., 1999; Kalaria et al., 2008; Llibre Rodriguez et al., 2008). A meta analysis in 11 European countries (Lobo et al., 2000) showed the standardised prevalence of dementia among people aged 65 years and over was 6.4%. An American study (Brookmeyer et al., 1998) showed that the prevalence in people aged 75 to 79, 80 to 84, 85 to 89 and 90 years and over were 4.3%, 8.5%, 16.0% and 28.5% respectively.

In the World Alzheimer Report of 2009 (Prince and Jackson, 2009), it was estimated that there were 35.6 million people living with dementia worldwide in 2010, increasing to 65.7 million by 2030 and 115.4 million by 2050. Although the prevalence of dementia is higher in high income countries, the number of people with dementia is not small in LAMICs. According to a report from the World Health Organisation (WHO) (WHO, 2002), three-quarters of people aged 60 and over live in LAMICs. Furthermore, new dementia cases are estimated at 4.6 million per year, mainly in China and south Asia (Kalaria et al., 2008).The Delphi study (Ferri et al., 2005) showed that in 2040, 71% of people with dementia will live in LAMICs. Therefore, it is clear that the number of people with dementia is set to increase in the next decades, especially in LAMICs.

## 1.3. Care for dementia people

Currently, there is no way to distinguish between people who will develop dementia and those who will not. Although several drugs may slow the progression of dementia, there is no effective medicine or intervention which can prevent or cure the disease. There is clear evidence that the mortality hazard among dementia patients is much higher than for those without dementia (Nozari et al., 2009; Prince et al., 2012a). The importance of care for dementia is clear because of the features of the disease, i.e. unclear cause, no prevention, no effective treatment and fatal outcome.

However, care for a person with dementia is difficult and complex and the caregiver burden for a patient with dementia is much higher than for those without it (Cotter, 2007; Dunkin and Anderson-Hanley, 1998; Grafstrom and Winblad, 1995). People with dementia have to overcome limitations in functional and cognitive domains, while their caregivers have increasing responsibility for providing help relating to activities of daily life and have to cope with the increasing dependency of the patient. Caregiver burden is substantial especially when the person with dementia has behavioural and psychological symptoms of dementia (BPSD) (Matsumoto et al., 2007).

In high income countries, many dementia patients are in nursing homes or institutions

(Grafstrom and Winblad, 1995; Schulz et al., 2004), and this may reduce some of the burden on caregivers (Zarit and Whitlatch, 1992). Compared with high income countries, more dementia patients are living at home and taken care of by unpaid family members in LAMICs, which leads to high costs of informal care in these countries (Prince, 2004; Wimo and Prince, 2010).

## 1.4. Cost of dementia

According to recent estimates in the World Alzheimer's Report 2010 (Wimo and Prince, 2010), the worldwide costs of dementia are around US$604 billion. These costs are equivalent to about 1% of the world's Gross Domestic Product (GDP). The costs of informal care and social care contribute most to this figure. The cost of informal care accounts for 58% of dementia costs in low income counties, 65% in lower-middle income countries and 40% in high income counties. Current estimates of dementia costs are substantial and these costs are expected to increase particularly in low and middle income countries (LAMICs), where population aging will be more pronounced (WHO, 2002) and so there will be relatively larger increases in the number of people with dementia (Wimo et al., 1997). Informal care represents a significant proportion of the total cost, especially in LAMICs (Gauthier and Touchon, 2005; Petersen et al., 1997). More details of current evidence regarding the costs of dementia will be summarised below and limitations of studies will also be discussed.

## 1.5. Rationale for investigating the costs of dementia

The health and welfare systems in LAMICs are not developed sufficiently to treat chronic conditions and in most cases are not able to adequately assist the elderly (Prince, 1997). Only a few governments have made dementia a health care priority (Brodaty et al., 2011). Assessing the costs of dementia using a robust methodology can provide policy makers with key information. First, by providing evidence on the cost of dementia it will be possible to see what savings could occur if there is an intervention to reduce the prevalence of the disease, or to reduce severity or slow down progression. As mentioned before, currently, there is no cure for dementia but

by estimating costs for different stages of dementia, the amount that would be saved if progression was delayed can be indicated. Second, a cost of illness study may help policy makers to realise that dementia utilises a high level of resources, which are not matched by research investment (Lowin et al., 2001). Third, although cost of illness studies do not provide sufficient information to identify efficient resource allocation (Byford et al., 2000; Rice et al., 2001), and may even "confuse, mask and mislead decision-makers" (Shiell et al., 1987), they can help identify the resources which should be included in economic evaluations (Behrens and Henke, 1988; Hodgson, 1989), which may assist policy makers in carrying out health/social care reforms (Knapp, 2007). Moreover, cost of illness studies can contribute to developing new strategies for dealing with conditions. For example, the United Kingdom and Australia released national reports (Alzheimer's Australia, 2011; Knapp et al., 2007) of dementia recently and establishing the cost of dementia was a key aspect of these reports. Following the UK report, new policy strategies (Department of Health UK, 2009) have been outlined to improve the services for the dementia patients.

Cost of illness studies do though often have methodological limitations. For example, if comorbidity is neglected then the costs assigned to a particular condition may be artificially high (McCrone, 1998). There is also debate about the most common method for valuing lost work and caregiver time in cost of illness studies - the human capital approach. This uses the average or age-gender specific wage but these may not truly represent productivity because of imperfectly functioning labour markets. Another approach for valuing informal care, the replacement cost method, has also been criticised. This uses a market price to value informal care based on what one would have to pay to replace the carers if they were not available. The method neglected the differences between formal and informal care in terms of efficiency, quality and any emotional input by informal carers (Koopmanschap et al., 2008).

## 1.6. Key issues in cost of illness studies of dementia

*The prevalence approach or incidence approach*

Two approaches can be used for conducting a cost-of-illness study for dementia: the prevalence approach or incidence approach(Wimo and Prince, 2010). The prevalence

approach usually uses cross-sectional data and the cost in one specific year is calculated for people with a specific condition such as dementia. This also allows the total cost for a country or a region to be estimated at a given time. The incidence approach uses a prospective design. New cases are identified and followed up over a period of time (usually lifetime) to show the cost over the disease course. Results generated using the incidence approach can demonstrate the economic consequences of care needs at an individual levels. Not surprisingly, the two approaches can produce very different findings.

One of the key objectives of this study is to assess the economic impact of dementia and to provide evidence as to the costs to policy makers. The prevalence approach to conducting a cost-of-illness study was considered to be most appropriate. It is easier as data are collected at one point in time rather than over the course of dementia.

In recent years, the 10/66 Dementia Research Group has conducted population-based surveys of dementia prevalence, incidence and impact in several LAMICs (Prince et al., 2008a; Prince et al., 2004b). The name '10/66' reflects the fact that about 66% of people with dementia live in LAMICs, while only 10% of the research that is conducted is based on these populations (Prince et al., 2007). The prevalence study across seven countries was finished by 2007 and the database was released for public use (Llibre Rodriguez et al., 2008). The work of the 10/66 Dementia Research Group provided a good opportunity to carry out a cost-of-illness study of dementia based on the prevalence approach.

*Top-down method and or bottom-up method*

For the calculation of costs in a cost-of-illness study, either a 'top-down' method or 'bottom-up' method can be used. The top-down method is uses cost data at collected at a macro or national level (e.g. from national registers) and costs can be distributed across different conditions. An example of a cost-of-illness study using the top-down method can be found from the Netherlands (Meerding et al., 1998). The study collected information on healthcare use from 22 healthcare sectors, and total cost was separated into 34 diagnostic groups. The results showed dementia was the leading cost among people aged 65 years and over, accounting for 9.5% of total health care costs among people aged 65-84 years and 22.2% among people 85 years and over.

But one of the problems with the top-down approach is that it can be difficult to allocate some costs to specific conditions.

The bottom-up method collects cost information at the individual level and the data is aggregated to generate the total cost for a condition. One of the problems is that the cost of care for people with (in this case) dementia may incorporate costs that are due to other conditions. It can be, therefore, difficult to distinguish the cost that is attributable to the condition of interest (Wimo and Prince, 2010). Examples of studies using the bottom-up method are summarised below.

*Categorisation of cost and classification for developing counties*

In economic analyses, costs are often categorised as direct costs and indirect costs. Broadly, direct cost refers to resources used, while indirect cost refers to resources lost (Wimo et al., 2007). Direct costs include any paid activities (Chisholm et al., 2000a) or behaviours which can be estimated directly from the market value or expenditure on services (Kang et al., 2007; Ostbye and Crosse, 1994). Direct costs can be divided into direct medical costs and direct non-medical costs (such as transportation costs) (Meltzer, 2001). Indirect costs largely refer to loss of productivity (Meltzer, 2001) or other impacts including costs due to being unable to engage in leisure (Chisholm et al., 2000a), and the decline in quality of life for the patient and emotional impact on caregivers (Knapp, 2007; Ostbye and Crosse, 1994). .

However, there is controversy surrounding the direct and indirect cost classification. For example, how best to categorise the cost of unpaid time spent on providing health and social care and support from family members and friends has been debated. Some researchers assume this is direct cost (Chisholm et al., 2000a) because they indicate the use of a resource (caregiver time), while others insist this is a type of indirect cost (Ostbye and Crosse, 1994) and it may more appropriate to treat it as lost productivity or leisure time. In the World Alzheimer Report 2010 (Wimo and Prince, 2010), the cost of unpaid family caregivers was classified as an indirect cost.

From literature reviews of the definitions of direct and indirect cost, it is clear that there is an overlap between the two. The main focus is how to categorise costs from

unpaid family members, which in some studies have been shown to account for about one-half of the total costs of dementia in Europe (Jonsson and Berr, 2005)and at least one-tenth of the total costs of dementia in LAMICs (Kang et al., 2007).

In this thesis, the cost of dementia is divided into two categories: the cost of medical care and the cost of social care. The cost of medical care includes costs of direct medical inputs, costs of direct non-medical inputs and indirect cost. Cost of direct medical care refers to the cost incurred through medical diagnoses, assessments and provision of treatment. Cost of direct non-medical inputs includes non-medical activities undertaken when receiving medical care, such as transportation costs. Indirect costs here include the productivity loss from carers that arises when accompanying the patient to receive medical care. Productivity losses for the participants themselves were not included as most of them were retired and the costs were considered to be very low (Wimo et al., 2011). The cost of social care refers to costs related to social welfare and support systems, as well as costs of family inputs. As informal care is an important component of total cost and is an interesting topic all over the world, it will be estimated separately within the category of social costs. Another component of social care in this thesis is paid home care, which does not refer to professional home care but refers to general household aid.

*Perspective of costs*

Cost can be estimated from different perspectives and these generate different results (Meltzer, 2001). Most cost of dementia studies have estimated cost at a societal level while others have used a more narrow perspective, such as costs for patients and their families (Jonsson and Berr, 2005). Both perspectives are important to evaluate the economic burden of dementia. In this thesis costs are reported at the public (government funded services) level and private (family and patient costs) level.

## 1.7. Review of previous cost of dementia studies

A review of how to estimate the cost of dementia in developing countries was conducted. At the same time, results from cost of dementia studies were also reviewed. Papers were identified using Pubmed. The search terms were (“cost” or

“cost-of-illness” or “expenditure” or “economic”) and (“dementia” or “Alzheimer’s disease”). Economic evaluations, which did not describe cost estimates in detail, were excluded. Papers which were not published in English were also excluded.

Cost-of-illness studies for dementia have been conducted in many (mainly high income) countries. National or regional reports have been published for the UK (Knapp et al., 2007), Europe as a whole (Jonsson and Berr, 2005; Wimo et al., 2011), the United States (Alzheimer's Association, 2012), and Canada (Alzheimer Society of Canada, 2010). In 2010, Alzheimer’s Disease International released the World Alzheimer’s Report 2010 (Wimo and Prince, 2010), which focused on the global economic impact of dementia. In addition to these comprehensive reports, much research has been carried out in specific high income countries, including Sweden, Denmark, Norway, and Finland (Jonsson et al., 2006), Korea (Kang et al., 2007), Germany (Kiencke et al., 2010), Hungary (Ersek et al., 2010), and Taiwan(Kuo et al., 2010). Evidences is also accumulating in middle and low-middle income countries, including Turkey (Zencir et al., 2005), Argentina (Allegri et al., 2007) and China (Wang et al., 2008).

In reviewing relevant cost of dementia studies it is apparent that there are two key ways to obtain relevant information: (i) collecting primary data directly from patients and (ii) using secondary data sources. The first approach can be facilitated by conducting primary surveys among people with dementia, while the second approach is to conduct analyses using summaries of the results contained in published studies.

Many cost of dementia studies calculate costs using information collected directly from (or relating specifically to) people with dementia. This approach can be easily carried out and is quite straightforward if a valid diagnosis can be obtained. However, this method is often carried out regardless of whether the costs relate specifically to dementia, and so it may over-estimate the costs of dementia. This may be a serious problem in this area as a large proportion of people with dementia are likely to have co-morbid conditions (Akobundu et al., 2006). Considering this problem, some studies (Wang et al., 2008) have attempted to collect cost information that relates only to the disease. However, this is hard to distinguish if the person has many co-morbid conditions. Moreover, dementia can increase the risk of some co-morbid conditions,

such as hip fractures, but costs of hip fractures may be not included in the cost of dementia. In this situation, the cost of dementia might be underestimated. Attributable cost, sometimes called the net cost (Ostbye and Crosse, 1994; Wimo and Prince, 2010), refers to the costs that arise specifically from dementia. A review studies estimating attributable cost will be provide below after a review of studies that have included all care costs.

*Primary data studies to estimate cost of care for people with dementia*

A study conducted in Sweden, Denmark, Norway and Finland included 272 patients (and caregivers) using memory clinics (Jonsson et al., 2006). Cost data were obtained using the Resource Utilization in Dementia (RUD) instrument, which has been shown to be a valid and reliable instrument for estimating resource use, especially caregiver time (Wimo and Nordberg, 2007). The perspective of this study was the societal level. Unit costs were collected from the opportunity cost of the resource. In this study, cost was divided into the costs of medical care and informal care. Cost for medical care included inpatient services and prescriptions. Informal care time was collected and the opportunity cost for the time was estimated separately for lost production time and lost leisure time. The value of lost production was defined as the value of the average salary, while the value of lost leisure was taken from a previous study carried out by the Swedish Road Authority. Money was presented in Swedish Kronor (SEK) (1 US$=8.09 SEK (September 2003)), but inflated using the standard consumer price index for other non-Swedish countries. Total annual costs per patient were about 172,000 SEK (21,260 US$). The average cost for people with severe dementia was higher than that for mild ones dementia (375,000 SEK (46,354 US$) and 60,700 SEK (7503 US$)respectively). Informal care time and its cost were associated with the Mini Mental State Examination (MMSE) rating. MMSE is a questionnaire to evaluate the cognitive impairment of dementia patients. The study showed the more severe the cognitive impairment was, the higher the patient costs. In general, the cost for community care represented about half of the total cost (51%), and costs for informal care and medical care were 27% and 22% of the total cost respectively.

A similar study conducted in Germany used data from a health insurance company (Kiencke et al., 2010). This study demonstrated that the average annual cost for a patient with dementia was from €7,028 (memantine group) to €13,549 (psychotropic

drugs and hypnotics/sedatives group) in 2005, and about half of the costs were due to professional paid home care.

A Hungarian study conducted in 2008 with 88 patients with dementia and their carers, recruited in a cross-sectional non-population based study, was conducted by Ersek et al. (2010). Bottom-up cost-of-illness calculations were used to estimate the cost of care for patients living at home. Official reimbursements were used as the costs for patients living in nursing homes. The findings showed that the average annual cost for people with dementia living at home was slightly higher than the cost for patients who lived in nursing homes (€6432 vs €6086). Costs were estimated at €846.8 million for the whole population. More than a half of the cost was due to direct care and 36% of the cost was a result of informal care.

A study carried out in Spain (Coduras et al., 2010) showed different distributions of costs of informal care, paid care and medical care. The study followed up 560 patients for one year. Patients were selected from neurology clinics by retrospective sampling procedures. Information on the use of health services were extracted from medical records, and data on the use of non-health resources were collected by interviewing caregivers. Total cost was divided into indirect, direct healthcare and direct non-healthcare cost. Indirect costs were the costs of work absence for informal caregivers. The unit costs of this were derived from the salary reported by interviewed caregivers, according to human capital method. Direct healthcare included medication, medical consultations, hospital admissions due to AD, medical testing, attendance at day centres, admission to residential care, and institutionalisation. Prices of healthcare services were obtained from a published database. Direct non-healthcare included both professional and informal caregiving involved in basic and instrumental activities of daily living and supervision. Unit costs of the time spent providing informal care and supervision was based on the median level of caregiver income. Costs of other items, consumables, and structural changes to the home due to AD, as well as patient transportation for healthcare needs were also included in the total cost, and were obtained from the patient/caregiver or by using official rates for patients whose information was not available. Time spent providing care and supervision by professional caregivers was priced using an average cost from a sample of companies and/or associations offering this service.

Other patient out-of-pocket expenses were determined by patient/caregiver reports. The results showed monthly average costs per patient were €1426, and these increased 10% over one year. The main increase was attributed to drugs, nursing home utilisation and institutionalisation. Most cost corresponded to care and supervision provided by unpaid family members (68% at baseline and 52% at one year follow-up). This decrease in the proportion of informal care was due to the increase of paid care and medical care.

The increase of total cost shown above was also revealed in another study from Spain (Turro-Garriga et al., 2010). This followed up 169 dementia outpatients and their caregivers for one year and found the cost increased 29% over time. It was reported that the increase was associated with physical and cognitive disability, age of the patients, and whether this was the only caregiver.

Costs estimated from a further Spanish study (Lopez-Bastida et al., 2006) were higher than those reported by Coduras's et al. Primary family caregivers for 237 AD patients were interviewed in 2001. Costs of direct health care included hospital admissions and emergency visits due to problems related to AD, and the unit costs were based on the Spanish Database on Medical Costs (SOIKOS), a relatively comprehensive database of health care unit costs in Spain. The costs of direct non-health care in this study referred to the informal care and were valued using the wage for a domestic cleaner. Indirect costs were the production loss caused by early retirement of the patients. Results from the study showed the average annual cost per patients with AD was €28,198 (about €2350 per month).

In the United States, 195 patients with dementia living in the community were recruited from three sites (Zhu et al., 2008c). Information on patients' use of direct medical care, direct nonmedical care and informal care were collected in the study. Direct medical care included hospitalisation, outpatient treatment and procedures, assistive devices, and medications. Direct non-medical care included home health aides, respite care, and adult day care. Unit costs for direct care were obtained from a public database (Zhu et al., 2006b) released by the Healthcare Cost and Utilization Project (HCUP). The project provided a national information resource on patient-level health care data in the United States, including cost and other data about

health services (US Department of Health and Human Services, 2012). For informal care part, carer hours for help with ADLs (including eating, dressing, and personal care) and IADLs (including shopping, chores, personal business, and transportation) were recorded. Unit costs of informal care were estimated from national average hourly wages. All cost values were adjusted by the medical care component of the Consumer Price Index of 2004. The results showed the average annual costs for Lewy bodies (DLB) patients and AD patients were about $35,000 and $25,000 each. The non-medical costs were higher among AD patients ($1,478 vs $947) and indirect costs were higher among DLB patients ($23,036 vs $17,136).

In Taiwan, cost information on 140 patients living in the community and those in institutions were collected from 2007 to 2008 (Kuo et al., 2010). Direct costs included medical care (such as outpatient services, inpatient stays, emergency service contacts, pharmacotherapy, and other therapies related to dementia) and personal care (such as nutritional supply, diapers, assistive devices, and clothing). The cost of medical care was estimated from out-of-pocket costs to families. Personal care service costs and transportation were also estimated. Indirect costs included the time costs to patients and caregivers for receiving the medical services, and the productivity loss in terms of reduced paid and unpaid economic activity. The value of the time spent by family members was assumed to be equivalent to the market value of home helps. The value of the productivity loss for informal caregivers was calculated according to their previous salary. The findings showed annual direct cost of institution-living patients was higher than the cost of community-living patients (464,193 New Taiwanese Dollar (NTD) (14,750 US$) vs 144,047 NTD (4577 US$)) and the main contributor to the total was the cost for care services. The indirect cost was higher in the home care group compared with the institutional care group (287,904 NTD (9149 US$) vs 35,665 NTD (1070 US$)) and the main component of this was the cost of family time spent in caring and travelling.

A study in Korea (Kang et al., 2007) recruited and interviewed 609 dementia patients and both direct and indirect costs were estimated. Direct cost referred to the costs which could be calculated using market values for diagnosis, treatment, care and rehabilitation. The direct cost was also further divided into medical costs (including costs for inpatient and outpatient services and related medication expenses), and

non-medical costs (out-of pocket expenses for alternative services, supplies, home care, transportation, accommodation and food). Indirect cost was based on production losses of patients and their caregivers, represented by the loss of salary or income. Average incomes or salaries were used where it was difficult to obtain actual data. The results showed that the average total cost per dementia patient was $7462, consisting of direct costs of $6626 and indirect costs of $836. The cost increased with increasing degrees of limitation in the patient's ADL. The total annual cost for the country was estimated to be 1.3-3.3 billion US dollars. Indirect costs accounted for only 11% of the total cost and this differed from an earlier study in Korea which found costs of informal care and missed work of caregivers were 55% of total annual cost (Suh et al., 2006). In this other study, informal care was valued according to the replacement cost approach by using the market price of paid professionals.

In addition to evidence from high income countries, information on costs can also be obtained from some developing countries. An observational study was carried out among 42 AD patients and their caregivers in Turkey (Zencir et al., 2005). The direct costs included medication and outpatient visits, and the indirect costs came from caregiver time to help with ADL and IADL. Medication was included but only drugs related to AD, with the unit cost of the medicine based on the average market price. Cost of outpatient visits was based on the average price of a private and public physician visit. Indirect costs were valued based on the wage of a nurse working at a public institution. The results showed the average annual cost per patient was between US$1766 for mild decline of cognitive function and US$4930 for severe cases. Medication costs were the most important cost among patients with mild or moderate decline of cognitive function, while costs for caregiver were the highest components among patients with severe decline of cognitive function. Cost of outpatient visits among patients with severe decline of cognitive function was the lowest among all patients.

Another example of a cost study for dementia in a LAMIC was from Argentina (Allegri et al., 2007). The investigators recruited 80 dementia patients from the community, 20 from institutions, and 25 people without dementia. The total costs of dementia were divided into direct costs and indirect cost. Direct costs included costs related to the care for the patients, such as medical care and other non-medical costs

incurred for receiving care. Unit costs of medical care service were estimated from official figures while the cost of prescriptions was obtained from pharmacy shops. Payments to salaried caregivers were based on self-report by relatives. The indirect costs in this study referred to informal care costs. Hourly wages were used to estimate the cost of informal care. The results showed the annual total cost of dementia was $8130 per patient living in the community and $14,860 for institutionalised patients. The research group further compared the costs among dementia sub-types (Rojas et al., 2011) and found no significant difference between the total costs among these.

Wang et al investigated 67 AD patients who attended AD clinic visits in a general hospital in Shanghai, China and their caregivers (Wang et al., 2008). Patients and caregivers were asked for information about resource utilisation during the past year. Direct costs were estimated from drug treatment provided, number of outpatient visits, inpatient admissions, transport, and formal or professional care. Indirect costs refereed to unpaid caregiving. Unit costs were derived from published prices of licensed drugs, local taxi price guidelines and market prices for home care and home help services. Indirect costs were valued according to the minimum hourly wage. For health care costs, only costs related to AD were recorded. The results showed the average direct cost and indirect cost per year was 8432 Chinese Renminbi (RMB) (1058 USD) and 10,568RMB (1326 USD) respectively.

*Primary data studies to estimate cost of care attributable to dementia*

Cost of dementia studies that seek to capture all costs for people with the condition have been described in the former section. This subsequent section will review studies that have sought to estimate *attributable* cost of dementia. Typically, these kinds of study recruit not only dementia patients but also people with normal cognitive status, so as to estimate the additional cost of dementia. The advantage of the attributable cost approach is that the cost should not be greatly influenced by other chronic conditions, which also lead to costs of medical care and social care. As such, this approach allows a better estimate of the 'true' cost of dementia.

However, this method also has disadvantages. As Wimo and Prince suggest (Wimo and Prince, 2010), it is difficult to distinguish the real attributable cost. For example, if a patient is totally dependent because of other physical problems acquired before

dementia, he or she may already receive sufficient care. The amount of the care may not increase because of a dementia diagnosis. However, that does not negate the reality that the patients do need care because of dementia and therefore some cost would occur due to it. In this situation, the attributable cost is difficult to define.

Certain methodological challenges therefore exist in the estimation of attributable costs (Akobundu et al., 2006). The attributable cost can be estimated by subtracting costs from matched controls considering important socio-demographic characteristics and co-morbid conditions. However, this method may overestimate the cost which may be influenced not only by matched factors. Another method for calculating the attributable cost is to run regression models by controlling for confounding factors. Both the subtraction method and the regression method have been used in published papers.

A Canadian study (Ostbye and Crosse, 1994) collected data from 10,263 people aged 65 years and over. Direct costs and indirect costs were estimated in the study. Direct costs referred to those that could be assessed directly from the market value of services, while indirect costs meant the costs related to unpaid care from family members. Costs were estimated for patients in different settings including the community and long-term care institutions. The cost of direct care per control subject was subtracted from the cost for those with dementia. The net cost for informal care was calculated by multiplying the net average hours per patient by a low estimation of the cost of professional caregiver time ($10). The annual net economic cost of dementia for Canada was estimated to be at least $3.9 billion. Care in long-term institutions and assistance with ADLs by professionals, family and friends in the community were the most significant components of the total.

A cost of dementia study in Denmark (Andersen et al., 1999) investigated costs for 245 people with dementia and 490 controls matched according to age and gender from the Danish Population Register system. The net cost of dementia was estimated using the subtraction method. However, resources identified in this study only included services from physicians, hospitals, community services, and specialised equipment. It did not include the cost of unpaid care by family members. The results showed that the estimated annual net cost of dementia per person was DKK 77,000

(11,473 US$). About three years later, a total of 465 people with and without dementia were interviewed again to show the influence of disease progression on changes in costs of health care (Andersen et al., 2003). The results showed health care costs increased with disease progression, particularly because of the decline of functional abilities.

A US study (Joyce et al., 2007) recruited 2475 AD patients and 4950 matched controls to examine the attributable direct costs of medical care for patients newly diagnosed with AD. Cost information was collected from inpatient, outpatient and pharmacy services both at the pre-diagnosis and follow-up period. This study found AD patients had costs that were four times higher than those for matched controls. However, informal care costs were not included.

An Israeli study (Beeri et al., 2002a) included 71 AD patients living in the community, 50 patients from institutions and 50 healthy subjects to explore the attributable cost of dementia. The difference in costs between AD patients and healthy controls was assumed to represent the attributable cost of AD. Direct costs included hospitalisation, visits to doctors, social services and medications. Caregivers were asked to report what extra services or help was needed by patients because they had dementia. The cost for the extra services or help was treated as the attributable indirect cost of dementia. The results showed the total costs for community-living patients were similar to the costs for institutionalised patients (about $17,000 per patient). However, indirect costs accounted for 60% of the total for community-living patients, while direct costs accounted for 85% of the total for institutionalised patients.

Another study from the US (Hill et al., 2005) recruited 6075 patients with dementia (broken down into sub-types) and/or cerebrovascular disease, and 14,023 people without dementia or cerebrovascular disease to act as controls. All costs related to health care services. The costs attributed to dementia patients were estimated from regression models controlling for demographic factors and comorbidities. The results showed costs for medical care among VD patients were the highest, followed by AD, other dementias (OD), and cerebrovascular disease without dementia (CVD).

Kuo et al examined the net cost attributable to AD in the US (Kuo et al., 2008). A

total of 25,109 AD patients were identified from a database and for each case three demographically matched controls were also selected. Costs were generated according to diagnostic cost group (DCG) models by using specific software to predict cost according to patients' demographic profiles and diagnosis (DxCG, 2003). The incremental cost of AD (i.e. the net cost) was calculated according to a regression model controlling for illness burden. Results showed that the estimated net cost of dementia was $2307 per year, and the key driver of the cost was inputs from the outpatient pharmacy.

*Secondary data studies to estimate the costs of dementia*

Two influential papers that have used the second approach were published in 2006 and 2007 (Wimo et al. 2007;Wimo et al. 2006). In these studies, age-specific dementia rates were estimated based on comprehensive literature reviews. The authors assumed the distribution of prevalence to be similar worldwide. They also assumed a relationship between dementia costs and GDP per person. This ratio could be calculated for some countries and was then used to estimate costs in other countries where dementia costs had not been calculated. For informal care costs, the authors reviewed about 40 studies to estimate the proportion of patients living at home and hours per day of informal care provided to them. The estimated worldwide cost of dementia was US$315 billion in 2005 with about 75% of the total costs occurring in high income countries. The highest costs were in the USA (US$76 billion), followed by Japan (US$34 billion) and China (US$30 billion). The lowest costs were in Malawi (US$7.1 million), Somalia (US$14.0 million) and Chad (US$21.1 million). The figures were updated in 2009 (Wimo et al., 2010) and these showed the cost of dementia at the societal level increased by 34% from 2005 to 2009.The greatest increases occurred in LAMICs.

The World Alzheimer's Report 2010 (Wimo and Prince, 2010) gave a comprehensive summary of the worldwide costs of dementia. The estimates of these costs were based on a gross cost-of-illness study using the prevalence approach from a societal perspective. Information was extracted from various sources and published papers. The global prevalence of dementia was based on an estimation from the World Alzheimer's Report in 2009, in which a systematic review was conducted. Costs in this report were divided into direct costs and costs for informal care. The direct costs

consisted of costs for medical care and costs for social care (in long-term residential or nursing home care facilities). Imputations for countries without data on direct costs were based on information from 21 countries where direct costs were available. Regional imputations were firstly conducted for local similar countries and the costs in the remaining countries were estimated using the GDP ratio method described above. For informal care, the proportions of patients living at home were estimated from a worldwide questionnaire survey conducted by Alzheimer's Disease International (ADI). Information was collected for ADLs, IADLs, and supervision and this could be linked to 63% to73% of the worldwide dementia population. Data for the remaining countries were imputed using the same procedure as in the estimation of direct costs. Costs were valued using average wages from the International Labour Organization (ILO) LABORSTA database. Imputation was conducted for countries without wage information according to countries with a similar GDP per person in the same WHO region. Average wages for males and females were used separately based on the estimation of caregiver gender distribution. The total worldwide costs of dementia were estimated to be US$604 billion in 2010 and 70% of the costs were from Western Europe and North America. The cost per patient with dementia was the highest in North America (US$48,605) and lowest in South Asia (US$903) and Western Sub-Saharan Africa (US$969). Findings from the report emphasised the difference in the care patterns in developed and LAMICs. In particular, it is apparent that the direct costs of care are key in high income countries, while costs for informal care are crucial in LAMICs.

Besides the above work of Wimo and colleagues, there have been country-specific estimates based on secondary data. A cost study on brain disorders in Finland (Sillanpaa et al. 2008) showed that dementia costs were highest among 12 selected conditions. This study reviewed evidences from the literature and estimated the costs to be nearly €1 billion for the whole country and about €20,000 per patient in 2004. There were four cost studies which used the same methodology as the study in Finland, being conducted in Belgium (Schoenen et al., 2006), Denmark (Olesen et al., 2008), Italy (Pugliatti et al., 2008), and Norway (Stovner et al., 2010). The results showed that dementia was one of the most costly diseases in the four countries: €2.2 billion for Belgium (€16,000 per patient), €800 million for Denmark (€15,000 per patient), €8.6 billion for Italy (€15,000 per patient), and €700 million for Norway

(€17,000 per patient). However, none of these studies clearly reported the indirect cost of dementia. Most studies (Olesen et al., 2008; Schoenen et al., 2006; Sillanpaa et al., 2008; Stovner et al., 2010) have also only reported cost for direct health care and direct non-medical cost. A similar study was carried out in Austria (Wancata et al., 2007) but because of language barriers, the full paper this was not reviewed.

Wimo and colleagues provided an updated estimate of the economic impact of dementia in the 27 countries of the European Union in 2008 (Wimo et al., 2011). Data were based on published European cost of illness studies. The costs were estimated to be €160 billion (€22,000 per patient per year). Across the European Union costs for informal care were 20% higher than for direct costs.

The economic and social cost of dementia was also investigated in Ireland based on secondary data analysis (O'Shea and O'Reilly, 2000). Economic impacts included mortality and life years lost, inpatient services, family care, community care and long term care. The loss of life was presented in years, and other effects were estimated in monetary units. The results showed that the costs for family care contributed most to the overall cost (IR£123 million, 50% of the total), followed by the cost of residential care (IR£81 million, 33% of the total) and community care (IR£24 million, 10% of the total). Inpatient care only accounted for 7% of total costs.

*Predictors of costs*

A number of studies have explored the predictors of cost. For example Bianchetti and colleagues carried out a longitudinal study from 1994 to 1996 in Italy among 103 patients living at home, and found that worse functional status of IADL and male gender predicted higher costs (Bianchetti et al. 1998). The study carried out in three sites in the US found patient dependence explained most variation in nonmedical costs, and functional impairment was the variable most associated with caregiving time (Zhu et al., 2008a; Zhu et al., 2008b). The study based in Sweden, Denmark, Norway and Finland (Jonsson et al., 2006) found lower cognitive function, worse behavioural disturbances, longer time since diagnosis, and higher dependency to predict higher costs. The study conducted in Shanghai, China (Wang et al., 2008) found total cost of dementia was associated with severity measured by cognitive function and ADL.

In another study, a sample of 1222 patients was recruited from Spain, Sweden, the UK, and the US (Gustavsson et al., 2011). The aim of the study was to identify predictors of the cost of care for people with AD. The findings revealed that ability to perform ADL was the most powerful predictor of costs for community residents in all countries. Other studies have also examined the relationship between severity and cost (Allegri et al., 2007; Gustavsson et al., 2011; Herrmann et al., 2010; Hux et al., 1998; Kang et al., 2007; Wimo et al., 1997; Wimo et al., 2007) and found a positive relationship. A very recent study only focused on the quantity of informal care among adults with cognitive impairment (Okura and Langa, 2011). The results showed the more severe the neuropsychiatric symptoms the patients had, the more hours of informal caregiver time were provided. This result demonstrated that neuropsychiatric symptoms are key predictors of cost in dementia patients.

## 1.8. Rationale for the current study

It is clear that until now most cost of dementia studies have come from high income countries, especially from Europe and North America. Some countries, such as the US have also produced comprehensive dementia reports that include information on the use and costs of health care services, long-term care services and hospital care (Nozari et al., 2009). Compared with high income countries, the evidence is lacking from large-sample population-based studies on the care of dementia and associated costs in LAMICs. Before 2008, the only study from South America which could be found was from Argentina (Allegri et al. 2007). Later the research group expanded the project and publish another paper (Rojas et al., 2011). Recently, there was a paper published from China, focusing on the cost of dementia (Wang et al., 2008). However, these studies were not all community based and very few patients were recruited.

Current estimations from secondary data for developing counties are indirect and rely on several assumptions. Some important parameters employed during the cost estimates, such as the prevalence of dementia and informal care time, have to be based on various assumptions. Cost estimations for LAMICs that rely on fewer assumptions are therefore warranted.

In summary, further research into the economics of dementia care in LAMICs is highly relevant, because:

- Dementia is a disease that is becoming increasingly prevalent and affects the elderly in LAMICs where the welfare systems are least able to cope.
- Findings on the cost of dementia based on robust methodologies will highlight a large and growing problem and provide policy makers with important information.
- Evidence on the costs of dementia, as well as the predictors of cost, are lacking in LAMICs.

## 1.9. Aim and objectives of the current study

This PhD project is based on analyses of data from an international collaborative dementia study, the 10/66 Dementia Research Group (http://www.alz.co.uk/1066). The 10/66 study describes the prevalence of dementia, explores its etiology, and describes care provided to patients.

The main aim of this PhD is to assess the impact of dementia in low and middle income countries (LAMICs) on service and family costs and to assess the impact of dependency and other factors on costs. Specific objectives are to (i) calculate the costs of dementia in LAMICs based on recognised cost-of-illness methods, (ii) to estimate the cost that can be attributed to the dementia, and (iii) to identify demographic and clinical predictors of dementia costs in LAMICs.

# Section 2. General Methodology and Study Design

This section describes the general methodology and study design of the 10/66 Dementia Research Group (DRG) population-based survey. The title of the 10/66 Dementia Research Group refers to 66% of people with dementia living in developing countries while less than one-tenth of population based research has been carried out in those settings. General information on the sample is also reported in this section.

## 2.1. Study design

Cross-sectional comprehensive one-phase surveys were conducted of all residents aged 65 and over in geographically defined catchment areas in seven developing countries from 2002 to 2007. Detailed information and response rates are shown in Table 2.1. Each of the studies used the same cross-culturally validated assessments, including dementia diagnosis and subtypes, mental disorders, physical health, anthropometry, demographics, extensive non-communicable disease risk factor questionnaires, disability/functioning, health service utilisation, care arrangements and caregiver strain.

**Table 2.1. Summary of settings in the 10/66 project**

| Country | Site | Setting | Achieved sample (completed interviews) | Response rate |
|---|---|---|---|---|
| China | Xicheng, Beijing | Urban | 1160 | 74% |
| | Daxing, Beijing | Rural | 1002 | 96% |
| India | Chennai | Urban | 1005 | 72% |
| | Vellore | Rural | 999 | 98% |
| Mexico | Mexico City | Urban | 1003 | 84% |
| | Morelos | Rural | 1000 | 86% |
| Peru | Lima | Urban | 1381 | 80% |
| | Canete | Rural | 552 | 88% |
| Cuba | Havana/Matanzas | Urban | 2944 | 94% |
| Dominican Republic | Santo Domingo | Urban | 2011 | 95% |
| Venezuela | Caracas | Urban | 1965 | 83% |
| Overall | 11 sites | 7 urban, 4 rural | 15,022 | |

## 2.2. Setting

The field studies were carried out in both urban and rural settings in China, India, Mexico and Peru, but were only implemented in urban areas in Cuba, the Dominican Republic and Venezuela. To interpret the findings from a multi-site cost-of-illness study, it is important to understand the economic and healthcare systems in each setting as they are potential key determinants of care arrangements and costs.

Table 2.2 provides general information about each country included. China has the largest population in the world and is the country with biggest area among all 10/66 project countries. Cuba and China have a relatively higher proportion of older citizens, and this is similar to more developed countries. Urbanisation in the Latin American countries is quite high compared with the Asian countries, with Venezuela having the highest figure. The female-to-male ratio among people aged 65 years and over in each country is lower than for those aged 15-64 years old. The Cuban population has much higher education attainment compared with the other 10/66 project countries.

Table 2.3 compares three indicators (maternal mortality rate, infant mortality rate, and life expectancy at birth) which describe the health status of the population among all project countries. With regard to all three indicators, people in Cuba, China and Mexico have relatively higher health status compared with the other counties, while India has the worst health status. Table 2.3 also includes two indicators describing the availability of health resources in each country. Cuba stands out compared to other countries. Mexico and China have relatively more resources compared with the Dominican Republic, India, Peru and Venezuela.

Table 2.4 describes some aspects of the political and economic system in each county. Cuba and China are officially communist states, while the others are republics. China, Mexico and India have relatively market oriented economic systems. The Dominican Republic and Venezuela rely relatively less on the agricultural economy. The Cuban economy is quite firmly controlled by central government. China and Peru have relatively large urban and rural differences in terms of GDP per capita. India has the lowest GDP per capita, while Mexico has the highest. China has the highest GDP growth rate. The Dominican Republic and India have higher unemployment rates

**Table 2.2. The geographic information and population in 10/66 project countries**

| Countries | Area | Population (July 2012 estimation) | 65 years and over (2012 estimation) | Urbanisation (2010 estimation) | Sex ratio (male/female) (2012 estimation) | School life expectancy[1] | Literacy |
|---|---|---|---|---|---|---|---|
| China | 9,596,961 sq km<br>World ranking: 4 | 1,343,239,923<br>World ranking: 1 | 9.1% | 47% | 15-64 years: 1.06<br>65 years and over: 0.92<br>total population: 1.06 | Total: 12 years<br>Male: 11 years<br>Female: 12 years (2009) | Total population: 92.2%<br>Male: 96%<br>Female: 88.5% (2007) |
| Cuba | 110,860 sq km<br>World ranking: 106 | 11,075,244<br>World ranking: 74 | 12% | 75% | 15-64 years: 1<br>65 years and over: 0.82<br>total population: 0.99 | Total: 18 years<br>Male: 16 years<br>Female: 19 years (2009) | Total population: 99.8%<br>Male: 99.8%<br>Female: 99.8% (2002) |
| Dominican Republic | 48,670 sq km<br>World ranking: 132 | 10,088,598<br>World ranking: 85 | 6.7% | 69% | 15-64 years: 1.04<br>65 years and over: 0.86<br>total population: 1.03 | Total: 12 years<br>Male: 11 years<br>Female: 13 years (2004) | Total population: 87%<br>Male: 86.8%<br>Female: 87.2% (2002) |
| India | 3,287,263 sq km<br>World ranking: 7 | 1,205,073,612<br>World ranking: 2 | 5.6% | 30% | 15-64 years: 1.07<br>65 years and over: 0.9<br>total population: 1.08 | Total: 10 years<br>Male: 11 years<br>Female: 10 years (2007) | Total population: 61%<br>Male: 73.4%<br>Female: 47.8% (2001) |
| Mexico | 1,964,375 sq km<br>World ranking: 14 | 114,975,406<br>World ranking: 11 | 6.7% | 78% | 15-64 years: 0.94<br>65 years and over: 0.81<br>total population: 0.96 | Total: 14 years<br>Male: 14 years<br>Female: 14 years (2008) | Total population: 86.1%<br>Male: 86.9%<br>Female: 85.3% (2005) |
| Peru | 1,285,216 sq km<br>World ranking: 20 | 29,549,517<br>World ranking: 42 | 6.5% | 77% | 15-64 years: 0.96<br>65 years and over: 0.9<br>total population: 0.97 | Total: 14 years<br>Male: 13 years<br>Female: 13 years (2006) | Total population: 92.9%<br>Male: 96.4%<br>Female: 89.4% (2007) |
| Venezuela | 912,050 sq km<br>World ranking: 33 | 28,047,938<br>World ranking: 45 | 5.6% | 93% | 15-64 years: 0.97<br>65 years and over: 0.79<br>total population: 0.98 | Total: 14 years<br>Male: 13 years<br>Female: 15 years (2008) | Total population: 93%<br>Male: 93.3%<br>Female: 92.7% (2001) |

[1] School life expectancy: the total number of years of schooling that a child can expect to receive.

Source: The World Fact Book, Central Intelligence Agency, https://www.cia.gov/library/publications/the-world-factbook/

**Table 2.3. Population health status of the 10/66 project countries**

| **Countries** | **Maternal mortality rate** (deaths/100,000 live births in 2010) | **Infant mortality rate** (deaths/1,000 live births in 2012) | **Life expectancy at birth (2012 estimation)** | **Physicians/1,000 population** | **Hospital bed /1,000 population** |
|---|---|---|---|---|---|
| China | 37<br>World ranking: 116 | 15.62<br>World ranking: 110 | Total population: 74.84 years<br>World ranking: 96<br>Male: 72.82 years<br>Female: 77.11 years | 1.415 (2009) | 4.06 (2009) |
| Cuba | 73<br>World ranking: 85 | 4.83<br>World ranking: 182 | Total population: 77.87 years<br>World ranking: 60<br>Male: 75.61 years<br>Female: 80.27 years | 6.399 (2007) | 5.9 (2009) |
| Dominican Republic | 150<br>World ranking: 62 | 21.3<br>World ranking: 91 | Total population: 77.44 years<br>World ranking: 64<br>Male: 75.28 years<br>Female: 79.69 years | NA | 1 (2009) |
| India | 200<br>World ranking: 54 | 46.07<br>World ranking: 49 | Total population: 67.14 years<br>World ranking: 161<br>Male: 66.08 years<br>Female: 68.33 years | 0.599 (2005) | 0.9 (2005) |
| Mexico | 50<br>World ranking: 108 | 16.77<br>World ranking: 103 | Total population: 76.66 years<br>World ranking: 73<br>Male: 73.84 years<br>Female: 79.63 years | 2.893 (2004) | 1.6 (2008) |
| Peru | 67<br>World ranking: 91 | 21.5<br>World ranking: 89 | Total population: 72.73 years<br>World ranking: 127<br>Male: 70.78 years<br>Female: 74.76 years | 0.92 physicians/1,000 population (2009) | 1.5 (2009) |
| Venezuela | 92<br>World ranking: 78 | 20.18<br>World ranking: 95 | Total population: 74.08 years<br>World ranking: 111<br>Male: 70.98 years<br>Female: 77.34 years | 1.94 (2001) | 1.3 (2007) |

Source: The World Fact Book, Central Intelligence Agency, https://www.cia.gov/library/publications/the-world-factbook/

**Table 2.4. Political and economic status in 10/66 project countries**

| Countries | Government type | Description of economic system | GDP per capita (ppp) | GDP - real growth rate | Unemployment rate (2011) |
|---|---|---|---|---|---|
| China | Communist state | Market oriented economic system. Large difference between urban and rural areas. | $8,400 (2011) World ranking: 122 | 9.2% (2011) World ranking: 9 | 6.5% World ranking: 68 |
| Cuba | Communist state | Balancing the need for loosening state control of economic system against a desire for firm political control | $9,900 (2010) World ranking: 112 | 1.5% (2010) World ranking: 169 | 3.2% World ranking: 27 |
| Dominican Republic | Democratic republic | Service sector has overtaken agriculture as the economy's largest employer, due to growth in telecommunications, tourism, and free trade zones. The economy is highly dependent upon the US, the destination for more than half of exports. | $9,300 (2011) World ranking: 115 | 4.5% (2011) World ranking: 84 | 14.6% World ranking: 146 |
| India | Federal republic | The economic system is developing into an open-market economy, yet traces of its past autarkic policies remain. Scarce access to quality basic and higher education | $3,700 (2011) World ranking: 165 | 6.8% (2011) World ranking: 35 | 9.8% World ranking: 109 |
| Mexico | Federal republic | Free market economy. Highly unequal income distribution. | $14,700 (2011) World ranking: 86 | 3.9% (2011) World ranking: 104 | 5.2% World ranking: 51 |
| Peru | Constitutional republic | Peru's economy reflects its varied geography. | $10,100 (2011) World ranking: 111 | 6.9% (2011) World ranking: 33 | 7.9% World ranking: 93 |
| Venezuela | Federal republic | Highly dependent on oil revenues, higher inflation | $12,600 (2011) World ranking: 96 | 4.2% (2011) World ranking: 94 | 8.2% World ranking: 98 |

Source: The World Fact Book, Central Intelligence Agency, https://www.cia.gov/library/publications/the-world-factbook/

compared with other counties, while Cuba has the lowest.

Table 2.5 describes the pension and health systems in each setting. Cuba has the most generous pension system among all countries. In other settings, pensions cover mainly the population who have worked in the past. China has the largest urban and rural difference in terms of the pension system, as the former working status of older people is very different for these settings. In all settings, health insurance covers the working population and in some countries it also covers their dependents. The urban populations generally have better health protection compared with the rural populations in China, India, Mexico and Peru. In Cuba, the government provides free medical services and no private hospitals exist. In the Dominican Republic, although the delivery of the service is free, prescriptions are covered from out-of-pocket payments.

Table 2.6 contains information on health financing for the project countries. In all countries except Cuba the system comprises multiple financing mechanisms comprising government financial support through taxation, personal out-of-pocket payments, health insurance, and international aid. Cuba has a public system with the funding mainly from the government and very limited personal private expenditure on healthcare. With the exception of Cuba, total health expenditure as a percentage of GDP is similar in the project countries, but there are differences in the proportions of financing from government. India has a very low level of government input with most of the cost covered by out-of-pocket payments. In China, Mexico and Venezuela the input from government is about 50% of the total health expenditure. Peru has a relatively high level of government input, while the Dominican Republic has more private expenditure on health. In Mexico and Venezuela, nearly half of the total health expenditure is from out-of-pocket payments.

The information in Table 2.7 is extracted with permission and adapted from the thesis of the first 10/66 sponsored PhD student (Dr. Renata Sosa) and shows information on the accessibility of health services in each setting. With the exception of rural Mexico, people in all other settings can readily access primary care services. China and Mexico have larger urban and rural differences in term of the accessibility of hospital services.

**Table 2.5. Social security and health care system in 10/66 catchment areas**

| Countries | Pension system for older people | Health insurance system | Care organization |
|---|---|---|---|
| China urban | Pension system is covered for most urban citizens, as most of the urban citizens are working population in public organizations. [1-4] | Health insurance for all urban employees. In Beijing, the scheme has been extended to all residents. [5] | There are three levels of hospital providing services from primary care to high technology services. Most of the care organisations are government-run. Private hospitals are now emerging. [6, 7] |
| China rural | Virtually no pension system for rural citizens, as most of the rural citizens are farmers who are out of pension system.[8, 9] | New rural cooperative medicine, with coverage for most of rural residents.[10-13] | Primary health facilities are located in each village. Private clinics also can be found in rural areas. Secondary level hospitals are only in the centre of rural districts. There are very few third-level hospitals in rural areas.[14] |
| Cuba urban | About 90 percent of Cubans have government jobs. If they work for 30 years, then they can have full retirement pension. Private workers have started to join the pension system. [15, 16] | National health system for all citizens, provided by the government. Free medical, hospital and dental care.[17-19] | There are no private hospitals or clinics as all health services are government run.[20] |
| Dominican Republic urban | Most of the current pensioners are from the public sector and military.[21, 22] | The health service is free at the point of delivery (other than for prescriptions) but has limited facilities, trained staff and medicines.[23] | Certain government-run clinics offer good services. Private clinics are also an option[23] |
| India urban | Pension schemes are largely the privilege of the workers in public organizations. The rest of the employees in unorganised and informal companies only have limited access to voluntary schemes.[24, 25] | Health insurance for government officers and for factory employees. [25-28] | Provided by publically owned hospitals and clinics. Private clinic are used as a supplement to public services, but only available for those on high incomes. [27] |

| | | | |
|---|---|---|---|
| India rural | Similar to the urban areas. | All rural residents can receive basic free medicine. [29] | Covered by primary health network and rural hospitals. Traditional healers are more popular than rural areas because of the cheaper prices.[29] |
| Mexico urban | Most pension plans are offered by public institutions and are provided to salaried forma workers and their beneficiaries. [30, 31] | Public health care is provided to all Mexican citizens. All Mexican citizens are eligible for subsidized health care regardless of their work status. Employed citizens and their dependents, however, are further eligible to use another health care program.[32-36] | Provided via public institutions, private entities, or private physicians.[32] |
| Mexico rural | Similar to the urban areas. | Rural citizen are still facing shortages of health protection.[33, 35] | Similar to the urban areas. |
| Peru urban | Combined with National Pension System (NPS) and Private Pensions System (PPS). The NPS is managed by the State, operates under a Pay-as-you-Go financial regime. The PPS is managed by some private sectors, and directly depends on the contributions made during pensioner's working life. [22, 37] | Public health insurance system has two sectors. One is called Seguro Integral de Salud (SIS), i.e. Comprehensive Health Insurance, which is mainly for poorest population. The other is called EsSalud (provided by Peruvian Social Security), which is for working families and individuals, and mainly in urban areas. Private health insurance also exists. [38-40] | Dual practices provided by public and provide health sectors and a free government health service for the poor.[38] |
| Peru rural | Similar to the urban areas. | SIS is covered only part of poor rural population based on family income. EsSalud covers very few rural populations. [39] | People live in remote areas where the nearest health service is six or seven hours away. Because of the strong beliefs in traditional medicine, many (about one third) Peruvians are seeking treatment with chamanes, or healers.[40] |

| | | | |
|---|---|---|---|
| Venezuela urban | About 21% of citizen aged 60 years and over can receive pension.[22] | The health system comprises both public and private sectors. The public sector includes the Ministry of Popular Power for Health (MS) and several social security institutions, salient among them the Venezuelan Institute for Social Security (IVSS). The private sector includes providers offering services on an out-of-pocket basis and private insurance companies.[41] | Both public and private health organization provide health services to the people in Venezuela. [42] |


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**Table 2.6. Health financing in 10/66 project countries**

| Countries | Health financing | Total health expenditure (THE) as percentage of (GDP) (2008) [1] | General government expenditure on health (GGHE) as percentage of THE (2008) [1] | Private expenditure on health (PvtHE) as percentage of THE (2008) [1] | Out of pocket expenditure as percentage of PvtHE (2008) [1] | Out of pocket expenditure as percentage of THE (2008) [1] |
|---|---|---|---|---|---|---|
| China | Health financing comprises government financial support, health insurance, and personal out-of-pocket expenses. [2-4] | 5 | 50 | 50 | 81 | 40 |
| Cuba | This is a public system, with funding through general taxation, public ownership of all health services, and health professionals who are direct state employees[5, 6] | 11 | 95 | 5 | 100 | 5 |
| Dominican Republic | Besides the government, international organisations offer financing from reimbursable and non-reimbursable sources in the form of donations, specific contributions, and technical cooperation.[7] | 6 | 37 | 63 | 66 | 42 |
| India | Because of the insufficient of public health financing, more private and international funds are integrated to public health system. [8-11] | 4 | 28 | 72 | 87 | 63 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Mexico | The major source of funding comes from federal taxes, with complementary contributions by states. Families also prepay a small premium based on their income. The poorest 20% of families are exempt from any contribution. [12-16] | 6 | 47 | 53 | 93 | 49 |
| Peru | The SIS is funded mainly from regular resources from the general budget. The remainder of the fund is from donations and contributions, international aid agencies, contributions from individuals, and public and private institutions. EsSalud is funded by employer contributions.[17-19] | 6 | 62 | 38 | 87 | 33 |
| Venezuela | The MS is financed with federal, state and county contributions. The IVSS is financed with employer, employee and government contributions. [20, 21] | 5 | 45 | 55 | 90 | 49 |

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**Table 2.7. Health service accessibility in 10/66 catchment areas**

| Centres | Accessibility of primary care centre | Accessibility of hospital services |
|---|---|---|
| China urban | Within 1 kilometre. | Within 5 kilometres |
| China rural | Village clinic within 1 kilometre. Larger primary health centres within 5 kilometres. | About 20 kilometres away |
| Cuba urban | Less than 250 metres. | About 5 to 10 kilometres away |
| Dominican Republic urban | Within 1 kilometre. | About 5 to 10 kilometres away |
| India urban | Mini health centres within 1 kilometre. Government primary health centres within 3 kilometres. | Within 6 to 8 kilometres |
| India rural | Within 2 kilometres | Within 5 to 7 kilometres. |
| Mexico urban | Within 1 kilometre | Within 1 kilometre. |
| Mexico rural | About 2 to 5 kilometres away | About 10 kilometres away |
| Peru urban | About 5 kilometres away | About 10 kilometres away |
| Peru rural* | About 5 kilometres away | About 10 kilometres away |
| Venezuela urban | Within 1 kilometre | About 1 kilometre away |

* From personal communication with the principal investigator in Peru
Source: Adapted from a PhD thesis (Renata Sousa, 2010) at the Institute of Psychiatry, King's College London

In summary, Cuba is relatively different to other 10/66 countries as it has a very high percentage of pension coverage, free medical care and relatively higher health status. Compared with other countries, India ranks relatively low in terms of health status, education attainment, and government input to health expenditure. To some extent, China and Mexico are similar in terms of the health status of the population and the level of government input to health expenditure. China and Peru are quite similar in terms of urban and rural difference in GDP per capita. In terms of the pension system, health insurance system and accessibility of hospital services, China has the largest urban and rural difference. In other settings, including India, Peru, and Mexico, the pension and health system are also quite different between urban and rural settings. While it may be of interest to combine the rural areas from all the countries and compare them with the combined urban areas, this is limited by the fact that other key differences (e.g. in terms of the economic system, pension system and health system) exist.

## 2.3. Participants and sample

All older people aged 65 years and over living in geographically defined catchment areas were invited to participate in the study. Middle-class or professional areas with high-income dwellers were excluded in the definition of urban catchment areas, while rural catchment areas were defined by a traditional agrarian lifestyle and low population density. Catchment area boundaries were precisely defined and all households in that area were identified and located on a map. Households were enumerated to identify possible eligible persons (all those aged 65 years and over) and age was formally determined on revisit for interview.

Precision calculations were implemented to determine the sample size. An overall sample of 2,000 would allow estimation of a typical dementia prevalence of 4.5% with a precision of +/- 0.9%. Rural and urban samples of 1,000 each would allow estimation of the same prevalence with a precision of +/- 1.2%. Ultimately, the sample size for each country was between 1933 and 2944 (generally around 2000, other than in Cuba where the sample size was 2944).

## 2.4. Procedure of the study

Ethical approvals were obtained from the ethical committees in the Institute of Psychiatry, King's College London, and each participating country.

All centres were extensively trained in the main diagnostic assessments. Two further one-week project training meetings were held with the participation of principal investigators (PIs) from every project country. A standardised manual with detailed information in terms of operating procedures was designed and it covered every aspect of the training and field procedures.

All assessments were translated into the relevant local languages (Spanish, Tamil and Mandarin) from English. Experienced bilingual panels reviewed the translations and made appropriated modifications.

A project coordinator from each country was nominated to supervise the survey. Each centre had four to ten interviewers. These were generally lay graduates, except in Cuba and China where medical doctors were used. All interviewers were carefully trained by the project coordinator in the study protocol and procedures, standard structured interviewing techniques, the administration and rating of the Geriatric Mental State(Copeland et al., 1986; Copeland et al., 2002), a structured clinical mental status assessment, and the neurological/physical examination.

Interviews were usually implemented in participants' own houses. Informed consent from the participants or relatives of participants who lack capacity for consent were obtained prior to the interviews and examinations. Illiterate persons were read the information sheet and consent form, and invited to express their consent verbally, which was witnessed. All participants received the full assessments in one stage, lasting approximately two to three hours. For each participant, an informant was identified to provide more information. The informant was a person who either knew the participant best or had spent the longest period of time with participant. In most families, informants were co-resident family members. But in some cases, a co-resident non-family member, or a non-co-resident family member, or a friend or neighbour was selected.

A set of EpiData (version 2.0) database files were designed by the London team. Paper and pencil versions of questionnaires were used in most countries except Cuba, where computer assisted personal interviews were carried out by using these EpiData database files. Information was checked by project coordinators before it was entered into computers. Each country had a specific data entry clerk and 100% double entry was requested. Data were extracted into SPSS (version 15.0), and cleaning, processing of derived variables, and diagnostic algorithms were run with SPSS syntax files. Data were checked in London after the first 100 interviews had been completed and on three to four occasions subsequently. In this thesis, 10/66 database version 3.0 was used for the whole analysis.

## 2.5. Measurements

The 10/66 DRG survey comprises questionnaires on participants' socio-demographic

characteristics, health status, risk factor exposures and health service use. A physical examination was carried out and an informant interview administered for information on care arrangements, and caregiver practical, psychological and economic strain. In more detail, measurements were carried out from three aspects: a household assessment, a participant interview and physical examination, and an informant interview.

The objectives of household assessment are to determine the age of the participant, record the household assets and household composition. Information collected through the participant interview and physical examination included:

(1) Socio-demographic characteristics: gender, age, education, marital status, household living circumstances, sources of income (pension and family support)
(2) Health service utilisation: by using the Client Service Receipt Inventory (CSRI) (Chisholm et al., 2000a), which had been adapted for use in LAMICs (Chisholm et al., 2000b). Information included any use of community services (primary care, hospital outpatient, private doctor, and dentistry) and hospital admission during the three months preceding the interview. More detailed information about health service utilisation is provided in Section 3.
(3) Health status: including self reported global health; self-reported diagnoses (stroke, diabetes, hypertension, heart disease, chronic obstructive pulmonary disease); treatments for diabetes and hypertension; a self-reported list of 12 commonly occurring physical impairments (arthritis or rheumatism, eyesight problems, hearing difficulties or deafness, persistent cough, breathlessness/difficulty breathing/asthma, heart trouble or angina; stomach or intestine problems, faints or blackouts, paralysis/weakness/loss of one leg or arm, skin disorders) (Duke University Centre for the Study of Aging and Human Development, 1978); disability (measuring activity limitation and participation restriction applying the World Health Organisation Disability Assessment Schedule -WHODAS II, which was developed by WHO for cross-cultural research(Ustun TB et al., 2010)).
(4) Cognitive test: including the Community Screening Instrument for Dementia (CSI'D') (Hall KS et al., 1993) and 10-word list learning task with delayed recall, modified from the Consortium to Establish a Registry for Alzheimer's Disease (CERAD) (Ganguli et al., 1996)

(5) Psychiatric examination: using a structured clinical mental state interview, the Geriatric Mental State (GMS) (Copeland et al., 1986; Copeland et al., 2002) to identify organicity (probable dementia), depression, anxiety and psychosis.
(6) Neurological assessment: using the Neurological Exam (NEUROEX) (Broe GA et al., 1976; Broe et al., 1998), a brief fully structured neurological assessment with objectified quantifiable measures of lateralising signs, parkinsonism, ataxia, apraxia and primitive 'release' reflexes.
(7) Direct physical assessments: pulse rate, systolic and diastolic resting blood pressure (average of two, sitting and standing), waist circumference, waist/hip ratio, walking test (5 metres walk, turn and return – timed and paces counted).
(8) Risk factors: including smoking, alcohol consumption, physical activity, and obesity (by measuring the waist circumference).

Informant interviews included:

(1) Socio-demographic characteristics of informant: including gender, age, education, marital status, and income
(2) The informant's mental health status: assessed by the Self-Reporting Questionnaire 20 (SRQ-20) (Mari and Williams, 1985)
(3) Cognitive status of participants: the informant section questions of the CSI'D were asked of informants to understand the recent cognitive and functional decline of the participants.
(4) Dependence of the participants (needs for care): A series of open-ended questions (Sousa et al., 2010b) addressed to a key informant, to define the family network, to establish if the older person needed and received care from family members or others and to identify who was responsible for organising and providing 'hands on' care. On the basis of these questions, the interviewer coded whether the older person required no care, care for some of the time or care for much of the time.
(5) Care arrangements: including information on informal care arrangements (time spent with the participant, and time spent assisting with communication, to use transport, to dress, to eat, and for personal hygiene and supervision), paid day and night care, and information on stopping or cutting back on work in order to provide care (Chisholm et al., 2000a; Chisholm et al., 2000b; Davis et al., 1997). More detailed information about care arrangements is provided in Section 3.

(6) Impact of providing care: caregiver strain was measured with the Zarit Burden Interview (ZBI) (Whitlatch et al., 1991; Zarit et al., 1980; Zarit et al., 1986) which has been validated and widely used in developed and developing countries. This information was only asked of the informants when participants needed care.

(7) Dementia diagnosis and subtype: measured by the History and Aetiology Schedule – Dementia Diagnosis and Subtype (HAS-DDS) (Dewey and Copeland, 2001), providing more detailed information on onset and course of dementia syndrome. This information was only asked of the informants when there was evidence from the informant section of CSI'D to suggest at least some possible cognitive and/or functional decline (a score of two or more).

(8) Behavioural and psychological symptoms of dementia: assessed by the Neuropsychiatric Inventory (NPI-Q) (Kaufer et al., 1998; Kaufer et al., 2000) for all informants.

## 2.6. Diagnosis of psychiatric and physical diseases

The diagnosis of dementia was fully described in a published paper (Prince et al., 2008b), with evidence supporting their criterion validity (Prince et al., 2003) and predictive validity (Jotheeswaran et al., 2010). In this thesis, dementia was diagnosed according to the 10/66 dementia criteria. In brief, a 10/66 dementia diagnosis was allocated to those scoring above a cut-off point of predicted probability for dementia. The cut-off point was calculated using coefficients derived from a logistic regression equation in a 10/66 pilot study. The independent variables in the equation included information from GMS, cognitive score from CSI-D for participants (COGSCORE), results of 10-word list learning task with delayed recall, and the cognitive score from the informant section of CSI-D (RELSCORE). Subtype of dementia was determined according to HAS-DDS. The severity of dementia was determined according to a computerised operationalisation of the Clinical Dementia Rating (CDR).

A diagnosis of depression was according to the criteria and definition of ICD-10 depressive episode (World Health Organization, 1992), based on the results from the GMS clinical interview. Hypertension was diagnosed according to self-reported hypertension and/or a blood pressure measurement meeting the World Health

Organisation/International Society of Hypertension (WHO-ISH) criteria (SBP >=140 mm Hg and/or diastolic blood pressure (DBP) >= 90mm Hg). Other physical diseases, including diabetes, ischemic heart disease, stroke, chronic obstructive pulmonary disease (COPD) were diagnosed according to self-report of clinician diagnoses (diabetes, myocardial infarction and stroke) or characteristic symptoms (angina and COPD).

The informant's mental health status was evaluated according to the score of SRQ-20. Those with eight points or over were classified as 'SRQ case', indicating the existence of a probable mental disorder(Mari and Williams, 1985).

## 2.7. General information of the sample in the study

Socio-demographic information, care arrangements, dependency, mental and physical status of participants, and socio-demographic information and health status of carers are reported for the whole sample (Tables 2.8 to 2.11) and for participants with dementia separately (Tables 2.12 to 2.15).

It is shown in Table 2.8 that more participants are female in the sample as a whole, ranging from 53% in rural Peru to 66% in the Dominican Republic. The proportion of participants aged 75 years and over is higher than those aged 74 and less, but participants are younger in rural China and India. The distribution of educational levels is similar across the sample as a whole, but participants in rural China and India have lower educational levels than those in other sites. About half of the participants across the whole sample are current married, with the Dominican Republic having the lowest rate and urban China the highest. Very few participants are in full- or part-time work, but the percentages of having jobs are highest in rural Mexico and rural China. Most participants some type of income, but variation can be found across sites. Only about half of the participants received income in rural China and urban India, while more than 90% of participants received income in urban China and rural India. Pension coverage shows substantial variation across sites. Urban China and Cuba have the highest coverage of pensions, while coverage is relatively low in the Dominican Republic, urban Mexico, India and rural China. There is a

noticeable rural/urban difference in China. The proportion of participants having private insurance also varies across the sites. No one has private insurance in rural India, and very few participants have it in Cuba and urban China. Rural and urban differences can be found in some countries, but in different directions. In Peru and Mexico, urban areas have a higher private insurance rate, while in China, the rural area has a higher rate. Compared with other sites, rural India has the lowest number of assets in the family.

Table 2.9 describes the care arrangements and dependency of participants in the 10/66 study. Very few participants live alone. Most participants live with children in Latin American sites, rural China and India. Only in urban China do most of the participants live with their spouses, and here there is the lowest rate of living with children under 16 years old. Disability, measured with the WHO-DAS, is highest in rural India. About 10% of participants need care in the sample as a whole. Differences in dependency can be found in rural and urban areas. Usually, participants from urban areas have higher dependency levels than those from rural area, except in India. Dependency is highly related to help with ADL and IADL, and supervision received. However, paid home care seems to be only related to economic status, as more participants receive paid home care in more developed urban areas.

Table 2.10 summarises the physical and mental status of participants. The prevalence of dementia is 9.2% in the sample as a whole. Variation can be found across sites, with the highest prevalence in the Dominican Republic (12%), and the lowest in rural China (5.6%). The prevalence of depression is 6.0% in the sample as a whole, being lower than the prevalence of dementia. However, the variation is larger across the sites than that for dementia, with the highest prevalence in the Dominican Republic (13.8%), and the lowest in urban China (0.3%). Both of the two sites in China have very low rates of depression prevalence compared with other sites. The prevalence of hypertension is the highest among physical diseases in all sites. Rural and urban differences can be found for all physical diseases in most of the sites, with participants in urban areas usually having higher prevalence rates of chronic physical disease. Participants in rural China and urban India have the lowest rates of physical impairment.

**Table 2.8. Socio-demographic characteristics of participants in the 10/66 study, by site**

| Variables | Cuba (N=2944) | Dominican Republic (N=2011) | Peru (urban) (N=1381) | Peru (rural) (N=552) | Venezuela (N=1965) | Mexico (urban) (N=1003) | Mexico (rural) (N=1000) | China (urban) (N=1160) | China (rural) (N=1002) | India (urban) (N=1005) | India (rural) (N=999) | Total (N=15,022) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Gender | | | | | | | | | | | | |
| Male | 1031 (35.0%) | 684 (34.0%) | 493 (35.7%) | 257 (46.6%) | 706 (36.5%) | 337 (33.6%) | 398 (39.8%) | 499 (43.0%) | 446 (44.5%) | 419 (42.3%) | 454 (45.4%) | 5724 (38.2%) |
| Female | 1913 (65.0%) | 1325 (66.0%) | 888 (64.3%) | 295 (53.4%) | 1226 (63.5%) | 666 (66.4%) | 602 (60.2%) | 661 (57.0%) | 556 (55.5%) | 571 (57.7%) | 545 (54.6%) | 9248 (61.8%) |
| Age group | | | | | | | | | | | | |
| 65-69 | 760 (25.9%) | 533 (26.5%) | 375 (27.2%) | 179 (32.4%) | 839 (42.8%) | 245 (24.5%) | 299 (29.9%) | 316 (27.2%) | 383 (38.2%) | 415 (41.5%) | 331 (33.1%) | 4675 (31.2%) |
| 70-74 | 789 (26.9%) | 520 (25.9%) | 352 (25.5%) | 141 (25.5%) | 469 (23.9%) | 329 (32.8%) | 252 (25.2%) | 362 (31.2%) | 296 (29.5%) | 318 (31.8%) | 350 (35.0%) | 4178 (27.8%) |
| 75-79 | 639 (21.8%) | 397 (19.7%) | 298 (21.6%) | 101 (18.3%) | 345 (17.6%) | 205 (20.5%) | 221 (22.1%) | 254 (21.9%) | 202 (20.2%) | 144 (14.4%) | 177 (17.7%) | 2983 (19.9%) |
| 80+ | 749 (25.5%) | 561 (27.9%) | 355 (25.7%) | 131 (23.7%) | 308 (15.7%) | 223 (22.3%) | 228 (22.8%) | 228 (19.7%) | 121 (12.1%) | 124 (12.4%) | 141 (14.1%) | 3169 (21.1%) |
| Education level of participants | | | | | | | | | | | | |
| No education | 75 (2.6%) | 392 (19.7%) | 37 (2.7%) | 84 (15.4%) | 156 (8.1%) | 227 (22.6%) | 327 (32.7%) | 232 (20.0%) | 579 (57.8%) | 428 (42.7%) | 660 (66.1%) | 3197 (21.4%) |
| Less than primary | 655 (22.3%) | 1022 (51.3%) | 90 (6.6%) | 141 (25.9%) | 445 (23.1%) | 354 (35.3%) | 510 (51.0%) | 153 (13.2%) | 114 (11.4%) | 234 (23.3%) | 195 (19.5%) | 3913 (26.2%) |
| Completed primary | 979 (33.3%) | 370 (18.6%) | 460 (33.5%) | 267 (49.1%) | 965 (50.1%) | 229 (22.8%) | 122 (12.2%) | 303 (26.1%) | 259 (25.8%) | 212 (21.1%) | 116 (11.6%) | 4282 (28.7%) |
| Completed secondary or higher | 1227 (41.8%) | 208 (10.4%) | 786 (57.2%) | 52 (9.6%) | 359 (18.6%) | 193 (19.2%) | 41 (4.1%) | 472 (40.7%) | 50 (5.0%) | 129 (12.9%) | 28 (2.8%) | 3545 (23.7%) |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Marital status of participants | | | | | | | | | | | | |
| Single | 275 (9.4%) | 139 (7.0%) | 145 (10.6%) | 68 (12.3%) | 189 (9.8%) | 63 (6.3%) | 42 (4.2%) | 3 (0.3%) | 22 (2.2%) | 21 (2.1%) | 5 (0.5%) | 972 (6.5%) |
| Married | 1271 (43.3%) | 586 (29.4%) | 784 (57.2%) | 308 (55.9%) | 921 (48.0%) | 470 (46.9%) | 538 (53.9%) | 829 (71.5%) | 585 (58.4%) | 523 (52.2%) | 481 (48.1%) | 7296 (48.8%) |
| Divorced/ widowed | 1390 (47.3%) | 1271 (63.7%) | 442 (32.2%) | 175 (31.8%) | 810 (42.2%) | 470 (46.9%) | 419 (41.9%) | 328 (28.3%) | 395 (39.4%) | 458 (45.7%) | 513 (51.4%) | 6671 (44.7%) |
| Job of Participants | | | | | | | | | | | | |
| Full time job | 136 (4.6%) | 99 (4.9%) | 6 (0.5%) | 13 (2.5%) | 91 (4.9%) | 54 (5.4%) | 108 (11.0%) | 2 (0.2%) | 389 (38.9%) | 82 (8.2%) | 50 (5.0%) | 1030 (7.0%) |
| Part time job | 29 (1.0%) | 79 (3.9%) | 19 (1.4%) | 21 (4.1%) | 58 (3.1%) | 69 (7.0%) | 224 (22.9%) | 2 (0.2%) | 5 (0.5%) | 71 (7.1%) | 139 (13.9%) | 716 (4.8%) |
| No job | 2763 (94.4%) | 1830 (91.1%) | 1308 (98.1%) | 478 (93.4%) | 1722 (92.0%) | 868 (87.6%) | 648 (66.1%) | 1155 (99.7%) | 607 (60.6%) | 850 (84.7%) | 810 (81.1%) | 13039 (88.2%) |
| Participants with any income | 2584 (87.8%) | 1281 (63.7%) | 983 (71.2%) | 382 (69.2%) | 1316 (67.0%) | 841 (83.8%) | 644 (64.4%) | 1096 (94.5%) | 524 (52.3%) | 510 (50.7%) | 904 (90.5%) | 11065 (73.7%) |
| Participants with any governmental or occupational pension | 2417 (82.1%) | 611 (30.4%) | 908 (65.7%) | 357 (64.7%) | 1147 (58.4%) | 729 (72.7%) | 254 (25.4%) | 1050 (90.5%) | 38 (3.8%) | 117 (11.6%) | 346 (34.6%) | 7974 (53.1%) |
| Participant has private insurance | 4 (0.1%) | 430 (21.4%) | 1111 (80.9%) | 399 (72.4%) | 862 (45.3%) | 546 (54.4%) | 280 (28.0%) | 14 (1.2%) | 769 (76.7%) | 13 (1.3%) | 0 | 4428 (29.7%) |
| Number of assets in the family | 5.7±1.0 | 5.0±1.4 | 6.1±0.6 | 4.7±1.3 | 6.2±1.0 | 6.1±1.0 | 4.0±1.8 | 5.5±0.7 | 5.6±1.4 | 4.1±1.5 | 2.8±1.5 | 5.3±1.5 |

Figures are numbers (percentages) except for number of assets in the family where the data are means (standard deviations)

**Table 2.9. Care arrangements and dependency of participants in the 10/66 study, by site**

| Variables | Cuba (N=2944) | Dominican Republic (N=2011) | Peru (urban) (N=1381) | Peru (rural) (N=552) | Venezuela (N=1965) | Mexico (urban) (N=1003) | Mexico (rural) (N=1000) | China (urban) (N=1160) | China (rural) (N=1002) | India (urban) (N=1005) | India (rural) (N=999) | Total (N=15,022) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Living arrangement of participants | | | | | | | | | | | | |
| Living alone | 261 (8.9%) | 254 (12.6%) | 45 (3.3%) | 44 (8.0%) | 61 (3.1%) | 106 (10.6%) | 112 (11.2%) | 54 (4.7%) | 49 (4.9%) | 44 (4.4%) | 120 (12.0%) | 1150 (7.7%) |
| Living with spouse | 804 (27.3%) | 439 (21.8%) | 232 (16.8%) | 119 (21.6%) | 326 (16.6%) | 264 (26.3%) | 269 (26.9%) | 571 (49.2%) | 219 (21.9%) | 160 (15.9%) | 187 (18.7%) | 3590 (23.9%) |
| Living with children | 1384 (47.0%) | 1033 (51.4%) | 830 (60.1%) | 315 (57.1%) | 1459 (74.2%) | 515 (51.3%) | 476 (47.6%) | 361 (31.1%) | 404 (40.3%) | 614 (61.1%) | 430 (43.0%) | 7821 (52.1%) |
| Living with other relatives | 495 (16.8% | 285 (14.2%) | 274 (19.8%) | 74 (13.4%) | 119 (6.1%) | 118 (11.8%) | 143 (14.3%) | 174 (15.0%) | 330 (32.9%) | 187 (18.6%) | 262 (26.2%) | 2461 (16.4%) |
| Living with children under 16 | 938 (32.1%) | 803 (40.0%) | 453 (32.9%) | 220 (39.9%) | 817 (53.2%) | 304 (30.3%) | 356 (35.6%) | 211 (18.3%) | 458 (45.9%) | 471 (52.2%) | 476 (47.6%) | 5507 (38.1%) |
| WHO-DAS score | 13.4±20.0 | 16.5±20.3 | 13.1±20.6 | 10.4±14.6 | 10.7±16.3 | 10.0±17.3 | 11.1±19.1 | 8.1±20.1 | 8.0±14.6 | 10.5±15.4 | 28.3±18.3 | 13.0±19.1 |
| Dependency | | | | | | | | | | | | |
| Need care much of the time | 169 (6.5%) | 143 (7.1%) | 75 (5.4%) | 10 (1.8%) | 98 (5.0%) | 56 (5.6%) | 30 (3.0%) | 119 (10.3%) | 30 (3.0%) | 14 (1.4%) | 25 (2.5%) | 769 (5.2%) |
| Need care some of the time | 92 (3.5%) | 94 (4.7%) | 60 (4.3%) | 16 (2.9%) | 111 (5.7%) | 58 (5.8%) | 52 (5.2%) | 64 (5.5%) | 24 (2.4%) | 15 (1.5%) | 60 (6.0%) | 646 (4.4%) |
| No dependency | 2335 (89.9%) | 1770 (88.2%) | 1246 (90.2%) | 524 (95.3%) | 1754 (89.4%) | 889 (88.6%) | 918 (91.8%) | 977 (84.2%) | 948 (94.6%) | 958 (97.1%) | 914 (91.5%) | 13233 (90.3%) |
| Received care | | | | | | | | | | | | |
| Any ADL help | 205 (7.0%) | 183 (9.1%) | 118 (8.5%) | 22 (4.0%) | 74 (3.8%) | 69 (6.9%) | 52 (5.2%) | 152 (13.1%) | 46 (4.6%) | 21 (2.1%) | 84 (8.4%) | 1026 (6.8%) |
| Any IADL help | 165 (5.6%) | 93 (4.6%) | 102 (7.4%) | 18 (3.3%) | 96 (4.9%) | 83 (8.3%) | 36 (3.6%) | 75 (6.5%) | 23 (2.3%) | 22 (2.2%) | 79 (7.9%) | 792 (5.3%) |
| Supervision | 84 (2.9%) | 39 (1.9%) | 91 (6.6%) | 14 (2.5%) | 88 (4.5%) | 48 (4.8%) | 24 (2.4%) | 16 (1.4%) | 8 (0.8%) | 17 (1.7%) | 17 (1.7%) | 446 (3.0%) |
| Day paid care | 34 (1.2%) | 41 (2.0%) | 45 (3.3%) | 2 (0.4%) | 28 (1.4%) | 4 (0.4%) | 1 (0.1%) | 83 (7.2%) | 1 (0.1%) | 0 | 0 | 239 (1.6%) |
| Night paid care | 10 (0.3%) | 28 (1.4%) | 27 (2.0%) | 2 (0.4%) | 10 (0.5%) | 2 (0.2%) | 0 | 81 (7.0%) | 0 | 0 | 0 | 160 (1.1%) |

Figures are numbers (percentages) except for WHO-DAS score where the data are means (standard deviations)

**Table 2.10. Health status of participants in the 10/66 study, by site**

| Variables | Cuba (N=2944) | Dominican Republic (N=2011) | Peru (urban) (N=1381) | Peru (rural) (N=552) | Venezuela (N=1965) | Mexico (urban) (N=1003) | Mexico (rural) (N=1000) | China (urban) (N=1160) | China (rural) (N=1002) | India (urban) (N=1005) | India (rural) (N=999) | Total (N=15,022) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Dementia | 323 (11.0%) | 242 (12.0%) | 130 (9.4%) | 36 (6.5%) | 145 (7.4%) | 93 (9.3%) | 87 (8.7%) | 84 (7.2%) | 56 (5.6%) | 75 (7.5%) | 108 (10.8%) | 1379 (9.2%) |
| Depression | 144 (4.9%) | 278 (13.8%) | 87 (6.3%) | 16 (2.9%) | 107 (5.4%) | 47 (4.7%) | 45 (4.5%) | 3 (0.3%) | 7 (0.7%) | 39 (3.9%) | 126 (12.6%) | 899 (6.0%) |
| Hypertension | 2173 (73.8%) | 1537 (76.4%) | 725 (52.5%) | 235 (42.6%) | 1423 (72.4%) | 694 (69.2%) | 565 (56.5%) | 734 (63.3%) | 570 (56.9%) | 687 (68.4%) | 445 (44.5%) | 9788 (65.2%) |
| Diabetes | 543 (18.4%) | 281 (14.0%) | 119 (8.6%) | 54 (9.8%) | 309 (15.7%) | 246 (24.5%) | 189 (18.9%) | 195 (16.8%) | 9 (0.9%) | 121 (12.0%) | 66 (6.6%) | 2132 (14.2%) |
| Ischemic heart disease | 415 (14.1%) | 60 (3.0%) | 91 (6.6%) | 24 (4.3%) | 120 (6.1%) | 39 (3.9%) | 15 (1.5%) | 115 (9.9%) | 12 (1.2%) | 49 (4.9%) | 28 (2.8%) | 968 (6.4%) |
| Stroke | 230 (7.8%) | 175 (8.7%) | 112 (8.1%) | 20 (3.6%) | 135 (6.9%) | 67 (6.7%) | 74 (7.4%) | 109 (9.4%) | 18 (1.8%) | 20 (2.0%) | 11 (1.1%) | 971 (6.5%) |
| COPD | 115 (3.9%) | 137 (6.8%) | 81 (5.9%) | 11 (2.0%) | 129 (6.6%) | 59 (5.9%) | 80 (8.0%) | 36 (3.1%) | 16 (1.6%) | 18 (1.8%) | 76 (7.6%) | 758 (5.0%) |
| Number of physical impairments | | | | | | | | | | | | |
| 0 | 1295 (44.0%) | 601 (29.9%) | 608 (44.0%) | 281 (50.9%) | 781 (39.7%) | 453 (45.2%) | 382 (38.2%) | 349 (30.1%) | 695 (69.4%) | 648 (64.5%) | 326 (32.6%) | 6419 (42.7%) |
| 1-2 | 1357 (46.1%) | 945 (47.0%) | 549 (39.8%) | 231 (41.8%) | 695 (35.4%) | 392 (39.1%) | 433 (43.3%) | 603 (52.0%) | 268 (26.7%) | 316 (31.4%) | 505 (50.6%) | 6294 (41.9%) |
| 3+ | 292 (9.9%) | 465 (23.1%) | 224 (16.2%) | 40 (7.2%) | 489 (24.9%) | 158 (15.8%) | 185 (18.5%) | 208 (17.9%) | 39 (3.9%) | 41 (4.1%) | 168 (16.8%) | 2309 (15.4%) |

Figures are numbers (percentages)

Detailed information on the characteristics of carers is summarised in Table 2.11. About 70% of carers are female in the sample as a whole. However, in rural China, about 66% of carers are male, and in urban areas fewer female carers can be found compared with Latin American sites and India. About 70% of carers are of working age (18-64) in the sample as a whole. Variation can be detected across sites, ranging from 40% in urban China to 90% in rural Mexico. The educational level of carers is relatively higher than that of participants in all sites (compared with figures in Table 2.8). Carers from India have the lowest educational level among all the countries, and carers from urban Peru have the highest educational level. More single carers can be found in Peru, Venezuela and Mexico, while more divorced/widowed carers are in the Dominican Republic. There are about 25% of carers with full-time jobs in the sample as a whole and 10% of them have part-time jobs. However, relatively more carers with full-time jobs are in rural China. In the whole sample, about 40% of carers are children of the participants, and about 30% of carers are spouses. Variation can be seen across sites. About 50% of carers are children of the participants in rural Peru, Venezuela, Mexico and rural China, while the percentage is only 20% in rural India. About 60% of carers are spouses in urban China, while the percentage is only about 10% in rural Mexico. About 10% of carers have mental health problems in the sample as a whole, ranging from 0.3% in rural China to about 18% in the Dominican Republic and urban Peru.

This thesis focuses on the costs of care for participants with dementia and so it is helpful to describe the above information for this population separately. From Table 2.12, it is shown that more participants with dementia patients are female, older, with a lower educational level, and divorced/widowed. Although there are some variations across sites, the general tendencies are same in all sites. Fewer people have a job among dementia patients that among the general population. Similar distributions can be found for income, pensions, private insurance and number of assets among participants with patients compared with the general population.

Table 2.13 reports on the care arrangements and dependency levels of participants with dementia. Similar situations can be found for living arrangement among those with dementia patients as compared with the general population. However, the disability levels measured by WHO-DAS are substantially higher among participants with dementia. They are more dependent and receive more ADL and IADL help,

**Table 2.11. Socio-demographic characteristics and health status of carers in the 10/66 study, by site**

| Variables | Cuba (N=2944) | Dominican Republic (N=2011) | Peru (urban) (N=1381) | Peru (rural) (N=552) | Venezuela (N=1965) | Mexico (urban) (N=1003) | Mexico (rural) (N=1000) | China (urban) (N=1160) | China (rural) (N=1002) | India (urban) (N=1005) | India (rural) (N=999) | Total (N=15,022) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Gender | | | | | | | | | | | | |
| Male | 885 (30.3%) | 554 (27.6%) | 385 (27.9%) | 151 (27.5%) | 577 (29.7%) | 262 (26.1%) | 201 (20.1%) | 494 (42.6%) | 661 (66.0%) | 242 (24.2%) | 173 (17.3%) | 4585 (30.6%) |
| Female | 2033 (69.7%) | 1454 (72.4%) | 996 (72.1%) | 398 (72.5%) | 1366 (70.3%) | 740 (73.9%) | 799 (79.9%) | 666 (57.4%) | 341 (34.0%) | 758 (75.8%) | 826 (82.7%) | 10377 (69.4%) |
| Age group | | | | | | | | | | | | |
| < 18 | 28 (1.0%) | 42 (2.1%) | 11 (0.8%) | 8 (1.5%) | 13 (0.7%) | 10 (1.0%) | 22 (2.2%) | 5 (0.4%) | 0 | 10 (1.0%) | 5 (0.5%) | 154 (1.0%) |
| 18-64 | 1893 (64.8%) | 1470 (73.3%) | 775 (56.2%) | 382 (70.0%) | 1508 (77.2%) | 736 (73.5%) | 894 (89.6%) | 455 (39.2%) | 677 (67.6%) | 844 (84.3%) | 874 (87.5%) | 10508 (70.2%) |
| 65+ | 1002 (34.3%) | 494 (24.6%) | 594 (43.0%) | 156 (28.6%) | 433 (22.2%) | 255 (25.5%) | 82 (8.2%) | 700 (60.3%) | 325 (32.4%) | 147 (14.7%) | 120 (12.0%) | 4308 (28.8%) |
| Education level of participants | | | | | | | | | | | | |
| Less than primary | 193 (6.6%) | 597 (29.8%) | 30 (2.2%) | 72 (13.1%) | 106 (5.4%) | 167 (16.8%) | 213 (21.4%) | 220 (19.0%) | 246 (24.6%) | 459 (45.9%) | 564 (56.5%) | 2867 (19.2%) |
| Completed primary | 445 (15.2%) | 512 (25.5%) | 241 (17.5%) | 189 (34.4%) | 621 (31.9%) | 189 (19.0%) | 235 (23.6%) | 202 (17.4%) | 229 (22.9%) | 303 (30.3%) | 217 (21.7%) | 3383 (22.6%) |
| Completed secondary | 1325 (45.4%) | 584 (29.1%) | 482 (35.0%) | 180 (32.8%) | 693 (35.6%) | 306 (30.7%) | 386 (38.8%) | 546 (47.1%) | 509 (50.8%) | 162 (16.2%) | 198 (19.8%) | 5371 (35.9%) |
| Completed tertiary | 958 (32.8%) | 312 (15.6%) | 626 (45.4%) | 108 (19.7%) | 528 (27.1%) | 335 (33.6%) | 160 (16.1%) | 192 (16.6%) | 18 (1.8%) | 77 (7.7%) | 20 (2.0%) | 3334 (22.3%) |
| Marital status of participants | | | | | | | | | | | | |
| Single | 105 (3.8%) | 1 (0.1%) | 358 (26.0%) | 141 (25.7%) | 560 (28.7%) | 264 (26.4%) | 211 (21.1%) | 45 (3.9%) | 22 (2.2%) | 129 (12.9%) | 67 (6.7%) | 1903 (13.1%) |
| Married | 1913 (68.4%) | 1012 (60.9%) | 858 (62.4%) | 355 (64.7%) | 1023 (52.5%) | 605 (60.5%) | 703 (70.3%) | 1084 (93.4%) | 964 (96.2%) | 813 (81.3%) | 865 (86.6%) | 10195 (70.3%) |
| Divorced/widowed | 777 (27.8%) | 650 (39.1%) | 160 (11.6%) | 53 (9.7%) | 365 (18.7%) | 131 (13.1%) | 86 (8.6%) | 31 (2.7%) | 16 (1.6%) | 58 (5.8%) | 67 (6.7%) | 2394 (16.5%) |
| Job of carers | | | | | | | | | | | | |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Full time job | 1059 (36.0%) | 349 (17.4%) | 199 (14.4%) | 48 (8.7%) | 508 (25.9%) | 199 (19.8%) | 198 (19.8%) | 223 (19.2%) | 645 (64.4%) | 138 (13.7%) | 103 (10.3%) | 3669 (24.4%) |
| Part time job | 109 (3.7%) | 267 (13.3%) | 123 (8.9%) | 88 (15.9%) | 201 (10.2%) | 174 (17.3%) | 221 (22.1%) | 4 (0.3%) | 16 (1.6%) | 84 (8.4%) | 246 (24.6%) | 1533 (10.2%) |
| No job | 1776 (60.3%) | 1395 (69.4%) | 1059 (76.7%) | 416 (75.4%) | 1256 (63.9%) | 630 (62.8%) | 581 (58.1%) | 933 (80.4%) | 341 (34.0%) | 783 (77.9%) | 650 (65.1%) | 9820 (65.4%) |
| Carers' relationship to participants | | | | | | | | | | | | |
| Spouse | 926 (31.7%) | 403 (20.1%) | 463 (33.6%) | 162 (29.5%) | 530 (27.3%) | 224 (22.4%) | 104 (10.4%) | 691 (59.6%) | 345 (34.4%) | 264 (26.4%) | 328 (32.8%) | 4440 (29.7%) |
| Children | 1057 (36.2%) | 738 (36.8%) | 505 (36.6%) | 257 (46.8%) | 928 (47.8%) | 497 (49.6%) | 480 (48.0%) | 317 (27.4%) | 521 (52.0%) | 297 (29.7%) | 200 (20.0%) | 5797 (38.7%) |
| Children in law or other relatives | 617 (21.1%) | 510 (25.4%) | 227 (16.4%) | 95 (17.3%) | 329 (16.9%) | 220 (22.0%) | 381 (38.1%) | 56 (4.8%) | 117 (11.7%) | 381 (38.1%) | 426 (42.6%) | 3359 (22.4%) |
| Non-relative | 323 (11.1%) | 355 (17.7%) | 185 (13.4%) | 35 (6.4%) | 156 (8.0%) | 61 (6.1%) | 35 (3.5%) | 95 (8.2%) | 19 (1.9%) | 58 (5.8%) | 45 (4.5%) | 1367 (9.1%) |
| SRQ case | 295 (10.1%) | 369 (18.3%) | 255 (18.5%) | 77 (13.9%) | 152 (7.8%) | 124 (12.4%) | 97 (9.7%) | 16 (1.4%) | 3 (0.3%) | 26 (2.6%) | 92 (9.2%) | 1506 (10.0%) |

Figures are numbers (percentages)

**Table 2.12. Socio-demographic characteristics of participants with dementia in the 10/66 study, by site**

| Variables | Cuba (N=323) | Dominican Republic (N=242) | Peru (urban) (N=130) | Peru (rural) (N=36) | Venezuela (N=145) | Mexico (urban) (N=93) | Mexico (rural) (N=87) | China (urban) (N=84) | China (rural) (N=56) | India (urban) (N=75) | India (rural) (N=108) | Total (N=1379) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Gender | | | | | | | | | | | | |
| Male | 97 (30.0%) | 73 (30.2%) | 44 (33.8%) | 12 (33.3%) | 37 (31.6%) | 24 (25.8%) | 32 (36.8%) | 32 (38.1%) | 23 (41.1%) | 28 (37.3%) | 29 (26.9%) | 431 (31.9%) |
| Female | 226 (70.0%) | 169 (69.8%) | 86 (66.2%) | 24 (66.7%) | 80 (68.4%) | 69 (74.2%) | 55 (63.2%) | 52 (61.9%) | 33 (58.9%) | 47 (62.7%) | 79 (73.1%) | 920 (68.1%) |
| Age group | | | | | | | | | | | | |
| 65-69 | 22 (6.8%) | 21 (8.7%) | 10 (7.8%) | 6 (16.7%) | 26 (18.3%) | 2 (2.2%) | 5 (5.7%) | 7 (8.3%) | 6 (10.7%) | 18 (24.0%) | 21 (19.4%) | 144 (10.5%) |
| 70-74 | 50 (15.5%) | 37 (15.3%) | 10 (7.8%) | 8 (22.2%) | 19 (13.4%) | 16 (17.4%) | 13 (14.9%) | 12 (14.3%) | 11 (19.6%) | 21 (28.0%) | 39 (36.1%) | 236 (17.2%) |
| 75-79 | 57 (17.7%) | 52 (21.5%) | 24 (18.6%) | 7 (19.4%) | 25 (17.6%) | 21 (22.8%) | 19 (21.8%) | 18 (21.4%) | 19 (33.9%) | 9 (12.0%) | 19 (17.6%) | 270 (19.7%) |
| 80+ | 193 (59.9%) | 132 (54.5%) | 85 (65.9%) | 15 (41.7%) | 72 (50.7%) | 53 (57.6%) | 50 (57.5%) | 47 (56.0%) | 20 (35.7%) | 27 (36.0%) | 29 (26.9%) | 723 (52.7%) |
| Education level of participants | | | | | | | | | | | | |
| No education | 20 (6.2%) | 77 (33.5%) | 6 (4.7%) | 12 (35.3%) | 23 (19.7%) | 49 (52.7%) | 44 (50.6%) | 25 (29.8%) | 38 (67.9%) | 44 (58.7%) | 93 (86.1%) | 431 (32.4%) |
| Less than primary | 107 (33.4%) | 105 (45.7%) | 10 (7.9%) | 9 (26.5%) | 37 (31.6%) | 29 (31.2%) | 33 (37.9%) | 15 (17.9%) | 5 (8.9%) | 9 (12.0%) | 8 (7.4%) | 367 (27.6%) |
| Completed primary | 115 (35.9%) | 32 (13.9%) | 62 (48.8%) | 11 (32.4%) | 52 (44.4%) | 9 (9.7%) | 5 (5.7%) | 18 (21.4%) | 10 (17.9%) | 19 (25.3%) | 6 (5.6%) | 339 (25.5%) |
| Completed secondary or higher | 78 (24.4%) | 16 (7.0%) | 49 (38.6%) | 2 (5.9%) | 5 (4.3%) | 6 (6.5%) | 5 (5.7%) | 26 (31.0%) | 3 (5.4%) | 3 (4.0%) | 1 (0.9%) | 194 (14.6%) |
| Marital status of participants | | | | | | | | | | | | |
| Single | 40 (12.5%) | 19 (7.9%) | 16 (12.7%) | 8 (22.2%) | 15 (12.8%) | 7 (7.5%) | 3 (3.4%) | 0 | 0 | 0 | 0 | 108 (8.0%) |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Married | 96 (29.9%) | 52 (21.7%) | 48 (38.1%) | 16 (44.4%) | 37 (31.6%) | 29 (31.2%) | 31 (35.6%) | 49 (58.3%) | 23 (41.1%) | 33 (44.0%) | 35 (32.4%) | 449 (33.4%) |
| Divorced/widowed | 185 (57.6%) | 169 (70.4%) | 62 (49.2%) | 12 (33.3%) | 65 (55.6%) | 57 (61.3%) | 53 (60.9%) | 35 (41.7%) | 33 (58.9%) | 42 (56.0%) | 73 (67.6%) | 786 (58.5%) |
| Job of Participants | | | | | | | | | | | | |
| Full time job | 2 (0.6%) | 2 (0.8%) | 0 | 0 | 0 | 0 | 2 (2.5%) | 1 (1.2%) | 8 (14.3%) | 3 (4.0%) | 4 (3.7%) | 22 (1.7%) |
| Part time job | 3 (0.9%) | 4 (1.7%) | 0 | 2 (5.9%) | 0 | 0 | 7 (8.8%) | 0 | 0 | 2 (2.7%) | 8 (7.4%) | 26 (2.0%) |
| No job | 316 (98.4%) | 236 (97.5%) | 121 (100.0%) | 32 (94.1%) | 111 (100.0%) | 87 (100.0%) | 71 (88.8%) | 83 (98.8%) | 48 (85.7%) | 70 (93.3%) | 96 (88.9%) | 1271 (96.4%) |
| Participants with any income | 273 (84.5%) | 126 (52.1%) | 83 (63.8%) | 25 (69.4%) | 67 (46.2%) | 78 (83.9%) | 51 (58.6%) | 79 (94.0%) | 24 (42.9%) | 32 (42.7%) | 80 (74.1%) | 918 (66.6%) |
| Participants with any governmental or occupational pension | 263 (81.4%) | 66 (27.3%) | 76 (58.5%) | 24 (66.7%) | 59 (40.7%) | 73 (78.5%) | 30 (34.5%) | 71 (84.5%) | 6 (10.7%) | 10 (13.3%) | 29 (26.9%) | 707 (51.3%) |
| Participant has private insurance | 0 | 32 (13.2%) | 91 (72.2%) | 25 (69.4%) | 56 (48.7%) | 43 (46.2%) | 17 (19.5%) | 5 (6.0%) | 35 (62.5%) | 1 (1.3%) | 0 | 305 (22.7%) |
| Number of assets in the family | 5.6±1.0 | 4.8±1.5 | 6.2±0.5 | 4.1±1.8 | 6.0±1.3 | 5.9±1.1 | 3.3±1.8 | 5.5±0.7 | 5.5±1.4 | 3.7±1.6 | 2.5±1.5 | 5.0±1.7 |

Figures are numbers (percentages) except for number of assets in the family where the data are means (standard deviations)

**Table 2.13. Care arrangements and dependency levels of participants with dementia in the 10/66 study, by site**

| Variables | Cuba (N=323) | Dominican Republic (N=242) | Peru (urban) (N=130) | Peru (rural) (N=36) | Venezuela (N=145) | Mexico (urban) (N=93) | Mexico (rural) (N=87) | China (urban) (N=84) | China (rural) (N=56) | India (urban) (N=75) | India (rural) (N=108) | Total (N=1379) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Living arrangement of participants | | | | | | | | | | | | |
| Living alone | 20 (6.2%) | 21 (8.7%) | 2 (1.5%) | 5 (13.9%) | 8 (5.5%) | 13 (14.0%) | 14 (16.1%) | 2 (2.4%) | 2 (3.6%) | 3 (4.0%) | 16 (14.8%) | 106 (7.7%) |
| Living with spouse | 68 (21.1%) | 53 (21.9%) | 24 (18.5%) | 5 (13.9%) | 21 (14.5%) | 24 (25.8%) | 20 (23.0%) | 44 (52.4%) | 8 (14.3%) | 11 (14.7%) | 11 (10.2%) | 289 (21.0%) |
| Living with children | 166 (51.4%) | 130 (53.7%) | 69 (53.1%) | 20 (55.6%) | 107 (73.8%) | 44 (47.3%) | 45 (51.7%) | 26 (31.0%) | 30 (53.6%) | 47 (62.7%) | 59 (54.6%) | 743 (53.9%) |
| Living with other relatives | 69 (21.4%) | 38 (15.7%) | 35 (26.9%) | 6 (16.7%) | 9 (6.2%) | 12 (12.9%) | 8 (9.2%) | 12 (14.3%) | 16 (28.6%) | 14 (18.7%) | 22 (20.4%) | 241 (17.5%) |
| Living with children under 16 | 108 (33.5%) | 94 (39.0%) | 35 (26.9%) | 14 (38.9%) | 61 (55.0%) | 36 (38.7%) | 27 (31.0%) | 7 (8.3%) | 34 (60.7%) | 32 (49.2%) | 58 (53.7%) | 506 (38.0%) |
| WHO DAS score | 43.4±31.9 | 35.4±29.0 | 47.8±31.6 | 30.9±27.1 | 34.5±29.7 | 28.6±29.1 | 31.6±31.7 | 54.9±33.5 | 42.0±30.0 | 23.4±22.7 | 44.1±23.0 | 39.0±30.6 |
| Dependency | | | | | | | | | | | | |
| Need care much of the time | 135 (45.0%) | 82 (33.9%) | 49 (37.7%) | 6 (16.7%) | 53 (36.6%) | 32 (34.4%) | 14 (16.1%) | 57 (67.9%) | 18 (32.1%) | 11 (14.9%) | 12 (11.1%) | 469 (34.6%) |
| Need care some of the time | 43 (14.3%) | 23 (9.5%) | 28 (21.5%) | 6 (16.7%) | 41 (28.3%) | 19 (20.4%) | 13 (14.9%) | 17 (20.2%) | 10 (17.9%) | 4 (5.4%) | 20 (18.5%) | 224 (16.5%) |
| No dependency | 122 (40.7%) | 137 (56.6%) | 53 (40.8%) | 24 (66.7%) | 51 (35.2%) | 42 (45.2%) | 60 (69.0%) | 10 (11.9%) | 28 (50.0%) | 59 (79.7%) | 76 (70.4%) | 662 (48.9%) |
| Received care | | | | | | | | | | | | |
| Any ADL help | 151 (46.7%) | 94 (38.8%) | 71 (54.6%) | 11 (30.6%) | 41 (28.3%) | 33 (35.5%) | 24 (27.6%) | 64 (76.2%) | 27 (48.2%) | 12 (16.0%) | 32 (29.6%) | 560 (40.6%) |
| Any IADL help | 137 (42.4%) | 64 (26.4%) | 60 (46.2%) | 8 (22.2%) | 45 (31.0%) | 39 (41.9%) | 14 (16.1%) | 41 (48.8%) | 15 (26.8%) | 14 (18.7%) | 30 (27.8%) | 467 (33.9%) |
| Supervision | 75 (23.2%) | 30 (12.4%) | 61 (46.9%) | 7 (19.4%) | 51 (35.2%) | 28 (30.1%) | 12 (13.8%) | 12 (14.3%) | 6 (10.7%) | 11 (14.7%) | 8 (7.4%) | 301 (21.8%) |
| Day paid care | 26 (8.0%) | 24 (9.9%) | 29 (22.3%) | 1 (2.8%) | 14 (9.7%) | 2 (2.2%) | 1 (1.1%) | 38 (45.2%) | 0 | 0 | 0 | 135 (9.8%) |
| Night paid care | 6 (1.9%) | 18 (7.4%) | 20 (15.4%) | 1 (2.8%) | 3 (2.1%) | 1 (1.1%) | 0 | 37 (44.0%) | 0 | 0 | 0 | 86 (6.2%) |

Figures are numbers (percentages) except for WHO-DAS score where the data are means (standard deviations)

supervision and paid home care.

Table 2.14 summarises the severity of dementia according to CDR and it is clear more participants with dementia are in mild levels in all sites. Among subtypes of dementia, AD is the most prevalent, followed by VD. Prevalence of other subtypes of dementia is relatively low. It is clear that dementia patients are likely to have co-morbid depression, chronic physical diseases and some degree of physical impairments.

Socio-demographic characteristics of carers of participants with dementia and their health status are described in Table 2.15. Most carers are female in all sites except for rural China. About 23% of carers are not of working age, ranging from 3.7% in rural India to 45.2% in urban China. Carers from India have the lowest educational levels and carers from urban Peru have the highest. Most of the carers are currently married and most of them do not have jobs. In contrast to the general population, it is clear that most of the carers are children in all sites except for rural India where the children-in-law or other relatives are the likely carers. Participants with dementia are less likely to have carers who are spouses compared with the general population.

## Summary of section

The general methodology and study design of the 10/66 survey have been introduced in this section. The study was a population based survey among people living in the community aged 65 years and over in seven developing countries. Trained interviewers collected information on socio-demographic factors, cognitive function, health status, health service utilisation, BPSD, dependency and care arrangements of the participants, and the impact on caregivers. Psychiatric and neurological examinations for participants were also conducted by interviewers. Detection of dementia was according to 10/66 dementia diagnoses. Depression was diagnosed according to ICD-10. Hypertension was diagnosed according to self-report and blood pressure measurement and self-report information was used in the diagnosis of other physical conditions.

Socio-demographic characteristics, care arrangements, dependency, mental and physical status of participants, and socio-demographic characterises and health status

of carers were reported among the whole sample and for participants with dementia separately. Most participants (in the general population and with dementia) were female, in the older age category, and had lower education levels. Very few participants still had a job, and this was even less among those with dementia. The receipt of income, pensions and having private insurance varied across sites. Very few participants lived alone. Most of the participants lived with children or children in law or other relatives, rather than lived with spouses. Dementia is clearly an important reason for dependency, which leads to more informal care and receipt of paid home care. Most of the carers were female in all sites except rural China. Most of the carers were still of working age, and this was even more so for carers of participants with dementia. However, many carers of working age did not have a job, and this may be related to their caring activities. Most of the carers were children, children in law or other relatives. Fewer spouses were the carers for participants with dementia compared to carers of those in the sample as a whole.

**Table 2.14. Severity and subtype of dementia and other health status of participants with dementia in the 10/66 study, by site**

| Variables | Cuba (N=323) | Dominican Republic (N=242) | Peru (urban) (N=130) | Peru (rural) (N=36) | Venezuela (N=145) | Mexico (urban) (N=93) | Mexico (rural) (N=87) | China (urban) (N=84) | China (rural) (N=56) | India (urban) (N=75) | India (rural) (N=108) | Total (N=1379) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CDR severity | | | | | | | | | | | | |
| Questionable and mild | 198 (61.3%) | 178 (73.6%) | 85 (65.4%) | 31 (86.1%) | 104 (71.7%) | 79 (84.9%) | 79 (90.8%) | 54 (64.3%) | 42 (75.0%) | 70 (93.3%) | 101 (93.5%) | 1021 (74.0%) |
| Moderate | 71 (22.0%) | 42 (17.4%) | 34 (26.2%) | 3 (8.3%) | 37 (25.5%) | 13 (14.0%) | 7 (8.0%) | 28 (33.3%) | 13 (23.2%) | 4 (5.3%) | 5 (4.6%) | 257 (18.6%) |
| Severe | 54 (16.7%) | 22 (9.1%) | 11 (8.5%) | 2 (5.6%) | 4 (2.8%) | 1 (1.1%) | 1 (1.1%) | 2 (2.4%) | 1 (1.8%) | 1 (1.3%) | 2 (1.9%) | 101 (7.3%) |
| Subtype | | | | | | | | | | | | |
| Not allocated | 88 (27.2%) | 66 (27.3%) | 34 (26.2%) | 18 (50.0%) | 46 (31.7%) | 35 (37.6%) | 54 (62.1%) | 25 (29.8%) | 26 (46.4%) | 57 (76.0%) | 90 (83.3%) | 539 (39.1%) |
| Pure AD | 156 (48.3%) | 56 (23.1%) | 50 (38.5%) | 10 (27.8%) | 50 (34.5%) | 27 (29.0%) | 15 (17.2%) | 25 (29.8%) | 19 (33.9%) | 10 (13.3%) | 6 (5.6%) | 424 (30.7%) |
| Pure VD | 35 (10.8%) | 54 (22.3%) | 19 (14.6%) | 4 (11.1%) | 25 (17.2%) | 14 (15.1%) | 6 (6.9%) | 31 (36.9%) | 8 (14.3%) | 2 (2.7%) | 3 (2.8%) | 201 (14.6%) |
| Mixed AD/VAD | 14 (4.3%) | 15 (6.2%) | 3 (2.3%) | 1 (2.8%) | 2 (1.4%) | 2 (2.2%) | 2 (2.3%) | 0 | 2 (3.6%) | 2 (2.7%) | 1 (0.9%) | 44 (3.2%) |
| Pure DLB | 9 (2.8%) | 17 (7.0%) | 5 (3.8%) | 3 (8.3%) | 6 (4.1%) | 1 (1.1%) | 2 (2.3%) | 0 | 0 | 2 (2.7%) | 3 (2.8%) | 48 (3.5%) |
| Mixed AD/DLB | 12 (3.7%) | 23 (9.5%) | 7 (5.4%) | 0 | 7 (4.8%) | 5 (5.4%) | 6 (6.9%) | 1 (1.2%) | 0 | 1 (1.3%) | 2 (1.9%) | 64 (4.6%) |
| FTD | 9 (2.8%) | 11 (4.5%) | 12 (9.2%) | 0 | 9 (6.2%) | 9 (9.7%) | 2 (2.3%) | 2 (2.4%) | 1 (1.8%) | 1 (1.3%) | 3 (2.8%) | 59 (4.3%) |
| Depression | 26 (8.0%) | 57 (23.6%) | 11 (8.5%) | 6 (16.7%) | 23 (15.9%) | 10 (10.8%) | 9 (10.3%) | 1 (1.2%) | 6 (10.7%) | 9 (12.0%) | 17 (15.7%) | 175 (12.7%) |
| Hypertension | 220 (68.1%) | 176 (72.7%) | 77 (59.2%) | 12 (33.3%) | 98 (67.6%) | 59 (63.4%) | 47 (54.0%) | 54 (64.3%) | 38 (67.9%) | 51 (68.0%) | 52 (48.1%) | 884 (64.1%) |
| Diabetes | 60 (18.6%) | 28 (11.6%) | 13 (10.0%) | 2 (5.6%) | 26 (17.9%) | 22 (23.7%) | 15 (17.2%) | 12 (14.3%) | 1 (1.8%) | 8 (10.7%) | 8 (7.4%) | 195 (14.1%) |
| Ischemic heart disease | 43 (13.3%) | 5 (2.1%) | 8 (6.2%) | 1 (2.8%) | 15 (10.3%) | 3 (3.2%) | 2 (2.3%) | 17 (20.2%) | 1 (1.8%) | 3 (4.0%) | 2 (1.9%) | 100 (7.3%) |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Stroke | 61 (18.9%) | 57 (23.6%) | 24 (18.5%) | 2 (5.6%) | 24 (16.6%) | 12 (12.9%) | 9 (10.3%) | 34 (40.5%) | 8 (14.3%) | 4 (5.3%) | 3 (2.8%) | 238 (17.3%) |
| COPD | 14 (4.3%) | 24 (9.9%) | 8 (6.2%) | 2 (5.6%) | 17 (11.7%) | 8 (8.6%) | 9 (10.3%) | 10 (11.9%) | 4 (7.1%) | 1 (1.3%) | 5 (4.6%) | 102 (7.4%) |
| Number of physical impairments | | | | | | | | | | | | |
| 0 | 118 (36.5%) | 62 (25.6%) | 52 (40.0%) | 10 (27.8%) | 57 (39.3%) | 28 (30.1%) | 18 (20.7%) | 15 (17.9%) | 15 (26.8%) | 49 (65.3%) | 16 (14.8%) | 440 (31.9%) |
| 1-2 | 164 (50.8%) | 103 (42.6%) | 47 (36.2%) | 20 (55.6%) | 45 (31.0%) | 42 (45.2%) | 43 (49.4%) | 43 (51.2%) | 36 (64.3%) | 24 (32.0%) | 55 (50.9%) | 622 (45.1%) |
| 3+ | 41 (12.7%) | 77 (31.8%) | 31 (23.8%) | 6 (16.7%) | 43 (29.7%) | 23 (24.7%) | 26 (29.9%) | 26 (31.0%) | 5 (8.9%) | 2 (2.7%) | 37 (34.3%) | 317 (23.0%) |

**Table 2.15. Socio-demographic characteristics and health status of carers of participants with dementia in the 10/66 study, by site**

| Variables | Cuba (N=323) | Dominican Republic (N=242) | Peru (urban) (N=130) | Peru (rural) (N=36) | Venezuela (N=145) | Mexico (urban) (N=93) | Mexico (rural) (N=87) | China (urban) (N=84) | China (rural) (N=56) | India (urban) (N=75) | India (rural) (N=108) | Total (N=1379) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Gender | | | | | | | | | | | | |
| Male | 64 (19.9%) | 44 (18.2%) | 22 (16.9%) | 5 (13.9%) | 28 (19.4%) | 16 (17.2%) | 22 (25.3%) | 28 (33.3%) | 36 (64.3%) | 23 (30.7%) | 21 (19.4%) | 309 (22.4%) |
| Female | 258 (80.1%) | 198 (81.8%) | 108 (83.1%) | 31 (86.1%) | 116 (80.6%) | 77 (82.8%) | 65 (74.7%) | 56 (66.7%) | 20 (35.7%) | 52 (69.3%) | 87 (80.6%) | 1068 (77.6%) |
| Age group | | | | | | | | | | | | |
| < 18 | 2 (0.6%) | 3 (1.2%) | 0 | 1 (2.8%) | 0 | 3 (3.2%) | 0 | 0 | 0 | 0 | 0 | 9 (0.7%) |
| 18-64 | 220 (68.1%) | 187 (77.3%) | 95 (73.1%) | 28 (77.8%) | 127 (87.6%) | 80 (86.0%) | 74 (85.1%) | 46 (54.8%) | 42 (75.0%) | 64 (85.3%) | 104 (96.3%) | 1067 (77.4%) |
| 65+ | 101 (31.3%) | 52 (21.5%) | 35 (26.9%) | 7 (19.4%) | 18 (12.4%) | 10 (10.8%) | 13 (14.9%) | 38 (45.2%) | 14 (25.0%) | 11 (14.7%) | 4 (3.7%) | 303 (22.0%) |
| Education level of participants | | | | | | | | | | | | |
| Less than primary | 18 (5.6%) | 74 (30.7%) | 2 (1.5%) | 2 (5.6%) | 7 (4.8%) | 23 (24.7%) | 25 (29.1%) | 17 (20.2%) | 12 (21.4%) | 34 (45.3%) | 57 (52.8%) | 271 (19.7%) |
| Completed primary | 47 (14.6%) | 65 (27.0%) | 19 (14.6%) | 15 (41.7%) | 44 (30.3%) | 16 (17.2%) | 19 (22.1%) | 7 (8.3%) | 22 (39.3%) | 22 (29.3%) | 30 (27.8%) | 306 (22.2%) |
| Completed secondary | 160 (49.5%) | 62 (25.7%) | 42 (32.3%) | 15 (41.7%) | 57 (39.3%) | 26 (28.0%) | 27 (31.4%) | 42 (50.0%) | 21 (37.5%) | 18 (24.0%) | 19 (17.6%) | 489 (35.5%) |
| Completed tertiary | 98 (30.3%) | 40 (16.6%) | 67 (51.5%) | 4 (11.1%) | 37 (25.5%) | 28 (30.1%) | 15 (17.4%) | 18 (21.4%) | 1 (1.8%) | 1 (1.3%) | 2 (1.9%) | 311 (22.6%) |
| Marital status of participants | | | | | | | | | | | | |
| Single | 8 (2.7%) | 0 | 53 (40.8%) | 11 (31.4%) | 34 (23.6%) | 26 (28.0%) | 17 (19.5%) | 4 (4.8%) | 4 (7.1%) | 7 (9.5%) | 8 (7.4%) | 172 (13.0%) |
| Married | 191 (63.7%) | 119 (56.9%) | 57 (43.8%) | 18 (51.4%) | 78 (54.2%) | 55 (59.1%) | 60 (69.0%) | 76 (90.5%) | 51 (91.1%) | 62 (83.8%) | 90 (83.3%) | 857 (64.9%) |
| Divorced/widowed | 101 (33.7%) | 90 (43.1%) | 20 (15.4%) | 6 (17.1%) | 32 (22.2%) | 12 (12.9%) | 10 (11.5%) | 4 (4.8%) | 1 (1.8%) | 5 (6.8%) | 10 (9.3%) | 291 (22.0%) |
| Job of carers | | | | | | | | | | | | |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Full time job | 99 (30.7%) | 36 (14.9%) | 30 (23.1%) | 6 (16.7%) | 27 (18.6%) | 14 (15.1%) | 18 (20.7%) | 18 (21.4%) | 23 (41.1%) | 15 (20.0%) | 14 (13.0%) | 300 (21.8%) |
| Part time job | 19 (5.9%) | 36 (14.9%) | 11 (8.5%) | 6 (16.7%) | 22 (15.2%) | 19 (20.4%) | 23 (26.4%) | 1 (1.2%) | 1 (1.8%) | 7 (9.3%) | 29 (26.9%) | 174 (12.6%) |
| No job | 205 (63.5%) | 170 (70.2%) | 89 (68.5%) | 24 (66.7%) | 96 (66.2%) | 60 (64.5%) | 46 (52.9%) | 65 (77.4%) | 32 (57.1%) | 53 (70.7%) | 65 (60.2%) | 905 (65.6%) |
| Carers' relationship to participants | | | | | | | | | | | | |
| Spouse | 62 (19.2%) | 36 (14.9%) | 17 (13.1%) | 6 (16.7%) | 18 (12.6%) | 5 (5.4%) | 11 (12.6%) | 32 (38.1%) | 15 (26.8%) | 15 (20.0%) | 15 (13.9%) | 232 (16.8%) |
| Children | 155 (48.0%) | 119 (49.2%) | 63 (48.5%) | 20 (55.6%) | 93 (65.0%) | 61 (65.6%) | 45 (51.7%) | 34 (40.5%) | 29 (51.8%) | 32 (42.7%) | 26 (24.1%) | 677 (49.2%) |
| Children in law or other relatives | 82 (25.4%) | 56 (23.1%) | 21 (16.2%) | 9 (25.0%) | 28 (19.6%) | 24 (25.8%) | 29 (33.3%) | 7 (8.3%) | 9 (16.1%) | 26 (34.7%) | 63 (58.3%) | 354 (25.7%) |
| Non-relative | 24 (7.4%) | 31 (12.8%) | 29 (22.3%) | 1 (2.8%) | 4 (2.8%) | 3 (3.2%) | 2 (2.3%) | 11 (13.1%) | 3 (5.4%) | 2 (2.7%) | 4 (3.7%) | 114 (8.3%) |
| SRQ case | 72 (22.3%) | 74 (30.6%) | 61 (46.9%) | 21 (58.3%) | 27 (18.6%) | 22 (23.7%) | 14 (16.1%) | 2 (2.4%) | 1 (1.8%) | 6 (8.0%) | 10 (9.3%) | 310 (22.5%) |

# Section 3. Methodology for estimating the costs of medical care and social care

The costs reported in this thesis are divided into the cost of medical care and the cost of social care. Medical care represents care provided by healthcare professionals. Social care refers to care provided by unpaid family members (informal care) or paid home carers (non-professional help, such as cleaning the house, helping with cooking or other activities of daily life). In this section, methodological issues in terms of the identification, measurement and valuing the costs of dementia will be discussed.

## 3.1. Medical care costs

### Cost identification

Medical attention for people with dementia is indicated for diagnosis, psycho-education and support for patients and carers, and attention to behavioural and psychological symptoms (Prince et al., 2011b; Prince et al., 2009). There is also considerable comorbidity with chronic physical health conditions, and a relatively high prevalence of physical impairments and depression (Prince et al., 2011a). Medical services include contact with primary care health professionals, public hospital doctors, other publically provided professionals (such as physiotherapists and nurses), and private health care services (including private doctors, dentists, and traditional healers). It also includes hospital inpatient care and medication prescribed and/or purchased. In receiving medical care use of other resources is required including transportation costs and time spent travelling and receiving services. Costs for medical care can be further divided into direct cost for receiving medical care (diagnostic assessments, examination and treatment), personal direct costs (especially transport and time costs) and indirect costs (loss of economic productivity).

### Service measurement

For each service, participants were asked if they had made use of it in the last three

months, how often they had used it, what the duration of contacts were, and how much money was spent on using the service. They were also asked if a friend or family member accompanied them and how much money was spent on travelling. For inpatient services, if the participant had been admitted in the past three months, they were asked to state the number of nights in hospital and the total price of the admission (if they paid themselves). Total costs of medication paid by the families in the last three months were also recorded.

**Calculation of service costs**

When calculating service costs it is very important to establish the perspective that is being taken. In this study, costs are calculated at both the private (personal) level and the public level.

***Private perspective***

From an individual perspective, the cost of health care use is the out-of-pocket expense and the time spent using services and travelling to use them. These have been collected in the study. Specifically:

- The 3-month total direct medical costs for participants were recorded and this amount was multiplied by four to estimate the annual private direct medical cost.
- Payment for transportation was also recorded and also multiplied by four to generate annual direct non-medical costs.
- Time spent receiving care by the participants and time spent by family members as part of the care process in the past three months was also recorded. The methodology used for valuing this time is the same as used in valuing social care and described in section 3.2. In brief, time spent by family members is valued as if it were working time, and so values representing lost work are used here. Time given up by the participants in using services is not included in the cost calculations. This is because most of the participants were retired at the time of the interview, and their lost productivity can be considered to be negligible (Wimo et al., 2011).

***Public perspective***

To value health and other care services we can make reference to an available data

resource or generate unit costs that are specific to the study. None of the countries in the 10/66 project have published any robust unit cost estimates for the services we measured. Moreover, it was not feasible to collect the information required to calculate unit costs for all countries. Therefore, an alternative approach, i.e. extrapolation through application of UK unit costs was employed and these focussed on using available data either collected in the study or from secondary sources.

*Application of UK unit costs*

This method assumes that the relationships between the unit costs of health and social care services among all the project countries are fixed. Therefore, if unit costs of all health and social care services from one country are known, and the ratios between costs in this country and other project countries for certain services are also known, then the unit costs for all services in all countries can be calculated. Specifically, the steps involved in these calculations are as follows:

(1) Determine the reference unit costs for each service from one country,

(2) convert the costs in this country to international dollars according to purchasing power parity to enable comparison,

(3) generate ratios for health and social care costs between the reference country and each project country, and

(4) apply those ratios to each service in the reference country to generate country specific unit costs.

*Reference unit costs*

In the UK, the Department of Health has been funding a publication entitled 'Unit Cost of Health and Social Care' since 1992 (Curtis, 2010) and it is updated every year. The aim of developing this publication has been to provide transparent and comparable information about the costs of health and social care for use in health economic studies. Data from this publication are used in numerous economic evaluations and cost of illness studies in the UK.

In this publication the authors bring together data from a variety of sources to estimate up to date nationally appropriate unit costs for key health and social care services in the UK. The figures were identified as closely as possible with long run marginal opportunity cost. The unit costs are calculated from the public perspective

rather than a private/individual perspective. The latter would mainly include out-of-pocket expenses, but given the system in the UK this would be inappropriate.

Information from this publication was seen as being suitable for the current analyses. Costs were identified for the following service types investigated in the 10/66 survey: government primary care worker, government hospital doctor, other government health worker and hospital inpatient services. For services for which unit costs were not included in the publication (such as private doctor, dentist, traditional healer and medication), out of pocket payments were used to directly calculate costs. The reason for this method is because these services are more open to market forces.

Details of estimating the unit costs, using UK data, of specific services measured in the 10/66 survey are as follows:

(1) Governmental primary care service

The governmental primary care service is assumed to be similar to general practitioner (GP) care in the UK. Patients go to the surgery or clinic to consult community health doctors and receive prescriptions. The unit cost for a visit to a GP consists of two components. The first is the salary of the GP. In the unit costs publication the cost excluding direct care staff elements but with qualification costs is used. Qualification costs refer to initial training costs to enable the GP to work. The second component is the cost for prescriptions. Prescription costs per consultation provided by the publication were used in the calculation.

(2) Contact with government funded hospital doctor

Hospital-based outpatient procedures in the unit cost publication are the most similar service to government hospital doctors in the survey, and the average cost of this was therefore used. In the unit cost publications these costs were presented differently for different years. In 2002, costs were presented for a wide range of specialities, including geriatric care. From 2003 to 2007, the costs were presented for a limited range of specialities, but still including geriatric care. In the first three years (2003-2005), the costs were for the first attendance, while in the last two years (2006-2007), the costs were based on three-year average estimates for follow-up attendances. In 2008, the contacts were defined as face to face attendances

(non-consultant led). Costs were presented for the first attendances and all follow up attendances, but without speciality differentiation. In 2009 and 2010, the cost was a weighted average taking into account all outpatient procedures, again with no speciality differentiation.

(3) Other government health worker

It was assumed that patients would not receive prescriptions when seeing government funded health workers other than doctors. Therefore, the cost is based on staff salaries, qualifications and overheads. In this study the unit cost for a community nurse (including district nursing sister, district nurse) was assumed to be representative of all government health workers.

(4) Hospital services

It was assumed that most of the inpatient care received by the participants was not based on advance plans; that is they were assumed to only be admitted when needing treatment. Therefore, the national average cost for non-elective inpatient stays was used for the unit cost of hospital services. However, as with the costs for outpatient services, the costs for inpatient care were not consistently presented across the years for which the unit cost publications were available. From 2002 to 2007, inpatient costs were presented as the cost per bed day for different categories of patients, including those receiving geriatric care. Weighted average costs for all inpatient services were listed for non elective and elective admissions and costs were shown for each episode, rather than per bed day in 2008. Information is also provided for 2007. In 2009 and 2010, non-elective inpatient costs were also divided into long stays and short stays.

Details of the unit costs available for the four types of services are shown in Table 3.1.

**Table 3.1. UK unit costs for health and social care services (2002-2010)**

| Service type | | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|---|---|---|---|
| Government Primary care | Salary costs, £ per minute | 1.9 | 1.9 | 2 | 2.1 | 2.2 | 2.6 | 2.7 | 2.7 | 2.8 |
| | Prescription costs, £ per prescription | 18 | 31 | 31 | 32 | 35 | 44 | 41 | 40 | 39 |
| Government hospital doctor, £ per visit | | 118[1] | 188[2] | 223[2] | 237[2] | 106[3] | 154[3] | 71[4] | 185[5] | 152[5] |
| Other government health worker, £ per hour in clinic | | 41 | 40 | 41 | 46 | 46 | 48 | 52 | 54 | 56 |
| Hospital services, £ per bed day | | 145[1] | 147[6] | 166[6] | 159[6] | 217[6] | 205[6] | - | - | - |
| Hospital services, £ per episode | | | | | | | 1502[7] | 1409[7] | 2141[8] | 2197[8] |

1 Geriatric service
2 Geriatric service, cost per first attendance
3 Geriatric service, cost per follow-up attendance, based on three-year average
4 Weighted average of all follow-up attendances (adult)
5 Weighted average of all outpatient procedures
6 Geriatric patients
7 Weighted average of all inpatient non-elective episodes
8 Non-elective inpatient episodes (long stays)

From Table 3.1, we can see that the estimations for the cost of government primary care doctors and other government health workers are consistent across the different years, while the estimations for the costs of government hospital doctors and other hospital services differ across the years, especially after 2008. NHS Reference Costs (UK Department of Health, 2010) are published regularly by the UK Department of Health and provide detailed cost information on an extended range of surgical procedures and medical treatments. The annual report is based on unadjusted costs and activity in each financial year, ending on 31 March. The first report was published for 1998-99, and the latest one available for this project was for 2009-10. The NHS reference costs for different hospital services are shown in Table 3.2. There are three databases in the table, including the NHS Trust database, the Primary Care Trust database, and the NHS Trust and Primary Care Trust combined database. Data were extracted from the databases and calculations were carried out according to the purpose of this thesis. For outpatient services, the figures are generated by calculating the average cost across all kinds of activities. For inpatient services, the costs are derived as the unit cost per bed day, by calculating the total costs of all kinds of inpatient services, and dividing by the sum of bed days. As the figures for hospital costs (outpatient and inpatient services) were drawn from NHS Reference Costs for NHS trusts and primary care trusts combined, it is preferable to use the information from the NHS reference cost directly.

**Table 3.2. NHS trust and Primary Care Trust reference cost in different years**

| Service types | Source | 2007-08 | 2008-09 | 2009-10 | 2008[1] | 2009[2] |
|---|---|---|---|---|---|---|
| Out patient (£ per visit) | NHS trust | 149 | 149 | 142 | 149 | 144 |
| | Primary Care Trust (PCT) | 215 | 219 | 232 | 218 | 229 |
| | NHS trust and PCT combined | 149 | 149 | 143 | 149 | 145 |
| Non-elective inpatient (£ per bed day) | NHS trust | 359 | 376 | 404 | 372 | 397 |
| | Primary Care Trust (PCT) | 251 | 310 | 307 | 295 | 308 |
| | NHS trust and PCT combined | 357 | 375 | 403 | 371 | 396 |
| Elective inpatient (£ per bed day) | NHS trust | 820 | 890 | 947 | 873 | 933 |
| | Primary Care Trust (PCT) | 258 | 432 | 312 | 389 | 342 |
| | NHS trust and PCT combined | 812 | 884 | 940 | 866 | 926 |

[1] 3 months from 2007-08 and 9 months from 2008-09
[2] 3 months from 2008-09 and 9 months from 2009-10

Source: Department of Health,
2007-08:http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_098945
2008-09:http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_111591
2009-10:http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_123459

*Ratios for health costs between UK and project countries*

WHO initiated the WHO-CHOICE (WHO, 2012b) (CHOosing Interventions that are Cost-Effective) project in 1998. The objective of the project was to provide policy makers with information when deciding on which interventions and programmes to provide using limited resources in order to maximise health. Country-level costs and effects of different health interventions are estimated and provided in the WHO-CHOICE report. The results have been summarised in regional databases, which are available on the internet.

In the WHO-CHOICE database, unit cost values for primary and secondary health care services are estimated and expressed both in international dollars and local currency units. The most recent figures were updated by the WHO to the years 2007 and 2008. In the database, both inpatient and outpatient unit costs are available. The inpatient unit cost presents the estimated cost per hospital bed-day, including non-direct medical cost (such as personnel, capital and food costs), but excluding

expenditures on drugs and diagnostic tests. The cost is categorised according to different levels and ownership of facilities. The levels include primary, secondary, and teaching hospitals. The ownership categories are public, private and non-governmental organisations (NGOs). The outpatient unit costs represent all cost components except for the costs of drugs and diagnostics. The costs are displayed for different levels of facility, area and ownership of the facility. The levels include health centre (with no beds), health centre (with beds), primary-level and secondary-level hospital. The area categories are urban and rural. Ownership is defined in the same way as for inpatient unit costs.

*Inpatient unit costs contained in the WHO-CHOICE database*

The unit costs for inpatient services among project countries in 2007 and 2008 are shown in Tables 3.3a and 3.3b.

*Outpatient unit costs contained in the WHO-CHOICE database*

The unit costs for outpatient services among project countries in 2007 and 2008 are shown in Table 3.4a and 3.4b.

*Ratios applied in the analysis*

Ratios applied in the analysis were determined considering different settings for each service. Government primary care could be treated as a kind of outpatient service in a health centre. An average ratio of cost per visit at a health centre (with no beds) and a health centre (with beds) owned by public organisations between the UK and each country could be used in the calculations. Government hospital doctor could be treated as an outpatient service in a public primary or secondary hospital. An average ratio of cost per visit at primary-level hospital and secondary-level hospital owned by public organisations between the UK and each country could again be used for calculation. It is not clear which level of the facility provides services by other government health workers. Therefore, an average ratio of all public facilities between the UK and each country was used.

**Table 3.3a. Unit costs for inpatient services in the WHO-CHOICE database among project countries and UK in 2007**

| Ownership | Level of facility (Cost per bed day, International $) | China | Cuba | Dominican Republic | India | Mexico | Peru | UK | Venezuela |
|---|---|---|---|---|---|---|---|---|---|
| Public | Primary-level hospital | 48.65 | 31.63 | 72.16 | 21.35 | 148.97 | 72.29 | 452.22 | 123.29 |
| | Secondary-level hospital | 50.75 | 33.00 | 75.28 | 22.27 | 155.41 | 75.42 | 471.77 | 128.62 |
| | Teaching hospital | 65.63 | 42.67 | 97.34 | 28.80 | 200.96 | 97.52 | 610.02 | 166.31 |
| Private | Primary-level hospital | 62.72 | 40.78 | 93.03 | 27.52 | 192.05 | 93.20 | 582.99 | 158.94 |
| | Secondary-level hospital | 65.43 | 42.54 | 97.05 | 28.71 | 200.36 | 97.23 | 608.20 | 165.81 |
| | Teaching hospital | 84.60 | 55.01 | 125.49 | 37.13 | 259.07 | 125.72 | 768.43 | 214.40 |
| NGO | Primary-level hospital | 56.18 | 36.53 | 83.34 | 24.66 | 172.05 | 83.49 | 522.26 | 142.38 |
| | Secondary-level hospital | 58.61 | 38.11 | 86.94 | 25.72 | 179.49 | 87.10 | 544.84 | 148.54 |
| | Teaching hospital | 75.79 | 49.28 | 112.42 | 33.26 | 232.08 | 112.63 | 704.51 | 192.07 |

Source: WHO http://www.who.int/choice/country/country_specific/en/index.html

**Table 3.3b. Unit costs for inpatient services in the WHO-CHOICE database among project countries and UK in 2008**

| Ownership | Level of facility (Cost per bed day, International $) | China | Cuba | Dominican Republic | India | Mexico | Peru | UK | Venezuela |
|---|---|---|---|---|---|---|---|---|---|
| Public | Primary-level hospital | 55.22 | 34.40 | 77.33 | 22.84 | 153.86 | 81.70 | 472.20 | 131.01 |
| | Secondary-level hospital | 57.61 | 35.89 | 80.67 | 23.83 | 160.52 | 85.23 | 492.61 | 136.67 |
| | Teaching hospital | 74.49 | 46.41 | 104.32 | 30.81 | 207.55 | 110.21 | 636.97 | 176.73 |
| Private | Primary-level hospital | 71.19 | 44.35 | 99.69 | 29.44 | 198.35 | 105.32 | 608.74 | 168.89 |
| | Secondary-level hospital | 74.27 | 46.27 | 104.00 | 30.72 | 206.93 | 109.88 | 635.06 | 172.20 |
| | Teaching hospital | 96.03 | 59.83 | 134.48 | 39.72 | 267.57 | 142.07 | 821.17 | 227.83 |
| NGO | Primary-level hospital | 63.78 | 39.73 | 89.31 | 26.38 | 177.69 | 94.35 | 545.33 | 151.30 |
| | Secondary-level hospital | 66.53 | 41.45 | 93.17 | 27.52 | 185.38 | 98.43 | 568.91 | 157.84 |
| | Teaching hospital | 86.03 | 53.60 | 120.47 | 35.58 | 239.70 | 127.28 | 735.63 | 204.10 |

Source: WHO http://www.who.int/choice/country/country_specific/en/index.html

**Table 3.4a. Unit costs for outpatient services in the WHO-CHOICE database among project countries and UK in 2007**

| Area | Ownership | Level of facility(Cost per outpatient visit, International $) | China | Cuba | Dominican Republic | India | Mexico | Peru | UK | Venezuela |
|---|---|---|---|---|---|---|---|---|---|---|
| Urban | Public | Health Centre (no beds) | 8.33 | 6.09 | 11.08 | 4.58 | 18.76 | 11.10 | 41.98 | 16.35 |
| | | Health Centre (with beds) | 10.28 | 7.52 | 13.69 | 5.66 | 23.16 | 13.70 | 51.84 | 20.19 |
| | | Primary-level hospital | 11.72 | 8.57 | 15.6 | 6.44 | 26.39 | 15.62 | 59.07 | 23.00 |
| | | Secondary-level hospital | 12.21 | 8.93 | 16.25 | 6.72 | 27.50 | 16.27 | 61.56 | 23.97 |
| | Private | Health Centre (no beds) | 11.73 | 8.59 | 15.62 | 6.46 | 26.43 | 15.64 | 59.17 | 23.04 |
| | | Health Centre (with beds) | 14.49 | 10.6 | 19.29 | 7.97 | 32.64 | 19.31 | 73.06 | 28.45 |
| | | Primary-level hospital | 16.51 | 12.08 | 21.98 | 9.08 | 37.20 | 22.01 | 83.26 | 32.42 |
| | | Secondary-level hospital | 17.21 | 12.59 | 22.91 | 9.47 | 38.76 | 22.94 | 86.77 | 33.79 |
| | NGO | Health Centre (no beds) | 11.13 | 8.14 | 14.81 | 6.12 | 25.07 | 14.83 | 56.11 | 21.85 |
| | | Health Centre (with beds) | 13.74 | 10.05 | 18.29 | 7.56 | 30.95 | 18.31 | 69.28 | 26.98 |
| | | Primary-level hospital | 15.66 | 11.46 | 20.84 | 8.61 | 35.27 | 20.87 | 78.95 | 30.74 |
| | | Secondary-level hospital | 16.32 | 11.94 | 21.72 | 8.98 | 36.75 | 21.75 | 82.27 | 32.04 |
| Rural | Public | Health Centre (no beds) | 5.86 | 4.28 | 7.79 | 3.22 | 13.19 | 7.81 | 29.53 | 11.50 |
| | | Health Centre (with beds) | 7.23 | 5.29 | 9.62 | 3.98 | 16.29 | 9.64 | 36.46 | 14.20 |
| | | Primary-level hospital | 8.24 | 6.03 | 10.97 | 4.53 | 18.56 | 10.98 | 41.55 | 16.18 |
| | | Secondary-level hospital | 8.59 | 6.28 | 11.43 | 4.72 | 19.34 | 11.44 | 43.29 | 16.86 |
| | Private | Health Centre (no beds) | 8.25 | 6.04 | 10.99 | 4.54 | 18.59 | 11.00 | 41.62 | 16.21 |
| | | Health Centre (with beds) | 10.19 | 7.46 | 13.57 | 5.61 | 22.95 | 13.58 | 51.38 | 20.01 |
| | | Primary-level hospital | 11.61 | 8.50 | 15.46 | 6.39 | 26.16 | 15.48 | 58.56 | 22.80 |
| | | Secondary-level hospital | 12.10 | 8.85 | 16.11 | 6.66 | 27.26 | 16.13 | 61.02 | 23.76 |
| | NGO | Health Centre (no beds) | 7.83 | 5.73 | 10.42 | 4.30 | 17.63 | 10.43 | 39.46 | 15.37 |
| | | Health Centre (with beds) | 9.66 | 7.07 | 12.86 | 5.32 | 21.77 | 12.88 | 48.72 | 18.97 |
| | | Primary-level hospital | 11.01 | 8.06 | 14.66 | 6.06 | 24.80 | 14.68 | 55.52 | 21.62 |
| | | Secondary-level hospital | 11.47 | 8.40 | 15.27 | 6.31 | 25.85 | 15.30 | 57.86 | 22.53 |

Source: WHO http://www.who.int/choice/country/country_specific/en/index.html

## Table 3.4b. Unit costs for outpatient services in the WHO-CHOICE database among project countries and UK in 2008

| Area | Ownership | Level of facility(Cost per outpatient visit, International $) | China | Cuba | Dominican Republic | India | Mexico | Peru | UK | Venezuela |
|---|---|---|---|---|---|---|---|---|---|---|
| Urban | Public | Health Centre (no beds) | 9.13 | 6.47 | 11.65 | 4.81 | 19.20 | 12.13 | 43.32 | 17.09 |
| | | Health Centre (with beds) | 11.27 | 7.99 | 14.39 | 5.94 | 23.71 | 14.98 | 53.49 | 21.10 |
| | | Primary-level hospital | 12.84 | 9.11 | 16.4 | 6.77 | 27.02 | 17.07 | 60.96 | 24.04 |
| | | Secondary-level hospital | 13.38 | 9.49 | 17.09 | 7.05 | 28.15 | 17.78 | 63.52 | 25.05 |
| | Private | Health Centre (no beds) | 12.87 | 9.13 | 16.43 | 6.78 | 27.06 | 17.09 | 61.06 | 24.08 |
| | | Health Centre (with beds) | 15.89 | 11.27 | 20.28 | 8.37 | 33.41 | 21.11 | 75.39 | 29.73 |
| | | Primary-level hospital | 18.10 | 12.84 | 23.11 | 9.54 | 38.08 | 24.05 | 85.39 | 33.88 |
| | | Secondary-level hospital | 18.86 | 13.38 | 24.09 | 9.94 | 39.68 | 25.07 | 89.53 | 35.31 |
| | NGO | Health Centre (no beds) | 12.20 | 8.65 | 15.58 | 6.43 | 25.66 | 16.21 | 57.90 | 22.83 |
| | | Health Centre (with beds) | 15.06 | 10.68 | 19.23 | 7.94 | 31.68 | 20.01 | 71.48 | 28.19 |
| | | Primary-level hospital | 17.16 | 12.18 | 21.92 | 9.04 | 36.11 | 22.81 | 81.46 | 32.13 |
| | | Secondary-level hospital | 17.89 | 12.69 | 22.84 | 9.42 | 37.62 | 23.77 | 84.89 | 33.48 |
| Rural | Public | Health Centre (no beds) | 6.42 | 4.55 | 8.20 | 3.38 | 13.50 | 8.53 | 30.47 | 12.02 |
| | | Health Centre (with beds) | 7.93 | 5.62 | 10.12 | 4.18 | 16.67 | 10.53 | 37.62 | 14.84 |
| | | Primary-level hospital | 9.03 | 6.41 | 11.53 | 4.76 | 19.00 | 12.00 | 42.87 | 16.91 |
| | | Secondary-level hospital | 9.41 | 6.68 | 12.02 | 4.96 | 19.80 | 12.51 | 44.67 | 17.62 |
| | Private | Health Centre (no beds) | 9.05 | 6.42 | 11.55 | 4.77 | 19.03 | 12.02 | 42.94 | 16.94 |
| | | Health Centre (with beds) | 11.17 | 7.92 | 14.26 | 5.89 | 23.50 | 14.84 | 53.02 | 20.91 |
| | | Primary-level hospital | 12.73 | 9.03 | 16.26 | 6.71 | 26.78 | 16.92 | 60.42 | 23.83 |
| | | Secondary-level hospital | 13.27 | 9.41 | 16.94 | 6.99 | 27.91 | 17.63 | 62.96 | 24.83 |
| | NGO | Health Centre (no beds) | 8.58 | 6.09 | 10.95 | 4.52 | 18.05 | 11.40 | 40.72 | 16.06 |
| | | Health Centre (with beds) | 10.59 | 7.51 | 13.52 | 5.58 | 22.28 | 14.07 | 50.27 | 19.83 |
| | | Primary-level hospital | 12.07 | 8.56 | 15.41 | 6.36 | 25.39 | 16.04 | 57.29 | 22.60 |
| | | Secondary-level hospital | 12.58 | 8.92 | 16.06 | 6.63 | 26.46 | 16.71 | 59.70 | 23.55 |

Source: WHO http://www.who.int/choice/country/country_specific/en/index.html

Hospital service is an inpatient service in hospital. Patients stay in hospital for several days. However, it is not clear which level of the facility the service is provided in or which kind of ownership the facility is. Again therefore, an average ratio of all inpatient services between the UK and each country was used. In the WHO-CHOICE database, the estimates for average length of stay in hospital are different between levels of facilities, but the same across the countries. The average lengths of stay in a primary-level hospital, secondary-level hospital, and teaching hospital are 7.15, 9.75 and 9.75 days.

No ratio was applied for the unit cost of private doctor, dentistry, traditional healer and medication. The out-of-pocket expenditure collected in the questionnaire was used for these cost calculations.

***Currency and time issue***

In the 10/66 project, data were collected from a number of countries, each with their own currency, and at different time periods. To make reasonable comparisons it was necessary to apply appropriate conversion rates to the figures. The methods for doing this are described below.

*Purchasing power parity (PPP)*

Purchasing power parities (PPPs) are exchange rates which aim to make adjustments to equalise the purchasing power of different currencies and also to enable costs to be compared for different years. PPPs for most countries in the world are available on the website of the International Monetary Fund (International Monetary Fund, 2012). However, PPPs for Cuba were not available and other sources were required for this country. The PPPs for the six other project countries plus the UK from 2002 to 2010 are shown in Table 3.5a. The local currency of a country can be converted to comparable international dollars by dividing by the PPP of that country in a specific year.

PPPs are also available from the World Health Organisation's Global Health Expenditure Database (WHO, 2012a), and allows conversions between national currency units (NCUs) to US dollar (US$). Information from this database on PPPs from 2002 to 2010 is shown in Table 3.5b.

**Table 3.5a. PPPs in International Monetary Fund World Economic Outlook Database (2002-2010)**

| Country | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|---|---|---|
| China | 3.250 | 3.267 | 3.403 | 3.448 | 3.466 | 3.624 | 3.822 | 3.759 | 3.933 |
| Dominican Republic | 9.328 | 12.208 | 18.018 | 18.223 | 18.606 | 19.112 | 20.523 | 20.909 | 21.734 |
| India | 13.99 | 14.226 | 14.467 | 14.669 | 14.973 | 15.323 | 16.130 | 16.807 | 18.513 |
| Mexico | 6.207 | 6.651 | 6.959 | 7.127 | 7.365 | 7.561 | 7.868 | 8.095 | 8.352 |
| Peru | 1.429 | 1.438 | 1.480 | 1.485 | 1.542 | 1.527 | 1.505 | 1.521 | 1.572 |
| United Kingdom | 0.653 | 0.659 | 0.655 | 0.649 | 0.648 | 0.648 | 0.653 | 0.656 | 0.667 |
| Venezuela | 0.533 | 0.705 | 0.920 | 1.151 | 1.315 | 1.451 | 1.852 | 1.984 | 2.878 |

Source: International Monetary Fund, World Economic Outlook Database, September 2010
http://www.imf.org/external/pubs/ft/weo/2011/02/weodata/index.aspx

PPPs are also provided by WHO-CHOICE for the year of 2007 and 2008. Data from the WHO Global Health Expenditure Database are used to generate WHO-Choice data.

With regard to the PPP for Cuba, it has been estimated by the United States Department of Agriculture Foreign Agricultural Service (http://www.fas.usda.gov/info/factsheets/cuba/poultry.html) that Cuba's per capita income is $1500. After adjusting for PPP, it rises to $3500, which implies that the PPP rate is 2.333. However, the above web site does not state the year for this estimation.

*Consumer price index (CPI)*

A consumer price index (CPI) measures changes in the prices of goods and services that households purchase across years. Such changes affect the real purchasing power of individual's incomes and consequently their welfare. Given that data in the 10/66 project were obtained for different years it was necessary to use such indexes. CPIs were available on the websites of the International Labour Organisation and International Monetary Fund. The figures from the Labour Statistics Database (LABORSTA) published by the International Labour Organisation are shown in Table 3.6a. For a specific country, the amount of money in a different year can be converted based on the amount of money in the original year by multiplying the ratio between the CPI of the two years (CPI of different year divided by the CPI of original year).

There are four categories in India relating to different employment levels. For this country an average index was calculated for use in the analyses.

**Table 3.5b. PPPs in WHO Global Health Expenditure Database (2002-2010)**

| Index | Country | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|---|---|---|---|
| WHO International $ (PPPs) | China | 3.282 | 3.297 | 3.428 | 3.448 | 3.465 | 3.622 | 3.822 | 3.764 | 3.946 |
| | Cuba | 1.135 | 1.183 | 1.198 | 1.230 | 1.295 | 1.361 | 1.357 | 1.408 | 1.408 |
| | Dominican Republic | 9.401 | 12.298 | 17.364 | 17.256 | 17.615 | 18.087 | 19.431 | 19.822 | 20.644 |
| | India | 13.578 | 13.764 | 14.550 | 14.669 | 15.118 | 15.531 | 16.217 | 17.280 | 18.763 |
| | Mexico | 6.550 | 6.810 | 7.215 | 7.130 | 7.223 | 7.327 | 7.470 | 7.690 | 7.951 |
| | Peru | 1.436 | 1.445 | 1.492 | 1.487 | 1.544 | 1.528 | 1.507 | 1.525 | 1.578 |
| | United Kingdom | 0.628 | 0.641 | 0.632 | 0.636 | 0.627 | 0.645 | 0.639 | 0.642 | 0.652 |
| | Venezuela | 0.534 | 0.706 | 0.919 | 1.153 | 1.316 | 1.460 | 1.873 | 2.011 | 2.909 |
| Exchange Rate - (NCU per US$) | China | 8.277 | 8.277 | 8.277 | 8.194 | 7.973 | 7.608 | 6.949 | 6.831 | 6.770 |
| | Cuba | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 0.926 | 1.000 | 1.000 | 1.000 |
| | Dominican Republic | 18.610 | 30.831 | 42.120 | 30.409 | 33.365 | 33.263 | 34.624 | 36.027 | 36.875 |
| | India | 48.610 | 46.583 | 45.316 | 44.100 | 45.307 | 41.349 | 43.505 | 48.405 | 45.726 |
| | Mexico | 9.660 | 10.790 | 11.290 | 10.900 | 10.900 | 10.930 | 11.130 | 13.510 | 12.636 |
| | Peru | 3.517 | 3.479 | 3.413 | 3.296 | 3.274 | 3.128 | 2.924 | 3.012 | 2.825 |
| | United Kingdom | 0.667 | 0.612 | 0.546 | 0.550 | 0.543 | 0.500 | 0.544 | 0.642 | 0.647 |
| | Venezuela | 1.161 | 1.607 | 1.891 | 2.090 | 2.147 | 2.147 | 2.147 | 2.147 | 2.582 |

Resource: WHO Global Health Expenditure Database
http://apps.who.int/nha/database/DataExplorerRegime.aspx

**Table 3.6a. CPIs contained in the International Labour Organisation Labour Statistics Database (2002-2010)**

| Country | Employment level | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|---|---|---|---|
| China | | 100.0 | 101.1 | 105.1 | 107.0 | 108.5 | 113.7 | 120.4 | 119.6 | 123.5 |
| Cuba | | 106.1 | 108.2 | 105.9 | 108.9 | 114.5 | 122.5 | 124.5 | | |
| Dominican Republic | | 114.6 | 146.1 | 221.2 | 230.5 | 247.9 | 263.1 | 291.1 | 295.3 | 314.0 |
| India | Agricultural workers | 102.6 | 106.8 | 109.8 | 113.4 | 121.2 | 130.9 | 143.0 | 160.9 | 180.1 |
| | Industrial workers | 108.2 | 112.5 | 116.6 | 121.5 | 127.7 | 136.0 | 147.5 | 163.2 | 182.8 |
| | Urban non-manual employees | 109.8 | 113.7 | 118.0 | 123.2 | 130.6 | 139.1 | 149.7 | 167.1 | 187.7 |
| | Delhi, Industrial workers | 107.0 | 110.9 | 116.3 | 126.1 | 125.6 | 131.7 | 141.0 | 151.6 | 166.7 |
| | Average* | 106.9 | 111.0 | 115.2 | 121.0 | 126.3 | 134.5 | 145.3 | 160.7 | 179.3 |
| Mexico | | 111.7 | 116.8 | 122.3 | 127.2 | 131.8 | 137.0 | 144.0 | 151.6 | 157.9 |
| Peru | Lima | 102.2 | 104.5 | 108.3 | 110.1 | 112.3 | 114.3 | 120.9 | 124.4 | 126.3 |
| United Kingdom | | 103.5 | 106.5 | 109.6 | 112.7 | 116.3 | 121.3 | 126.1 | 125.5 | 131.3 |
| Venezuela | Caracas | 137.8 | 180.6 | 219.9 | 255.0 | 289.8 | 343.9 | 452.1 | 581.4 | |

* Not in the original database.
Source: International Labour Organization, LABORSTA, 2012 http://laborsta.ilo.org/

CPIs were also available in from the World Economic Outlook Database produced by the International Monetary Fund. Table 3.6b shows the indexes for 2002 to 2010. The estimations use 1984 as a base year and averages for the year and the end of the period are provided. In this table, the figures for Venezuela are very high. It is because the currency unit for Venezuela is an old unit, called the Venezuelan Bolivar. The latest currency unit in Venezuela is called Venezuelan Bolivar Fuerte, one Bolivar Fuerte being equal to 1000 Bolivars.

**Process of calculating unit costs in study**

*Reference unit cost*

When the cost for health services is to be estimated, a reference unit cost can be estimated from one of the project countries, where the government input for health services is the least. The assumption here is that the payment made by individuals then is similar to the actual cost. However, in reality the out-of-pocket-costs are very unlikely to represent 100% of the true cost, and medical costs generated using this method will be underestimated. The figures from the UK are comprehensively calculated and are unlikely to underestimate the health service cost. However, this method has disadvantages. The main disadvantage is that the UK is dissimilar to all project countries. Furthermore, matching of services in the UK to services measured in the 10/66 project may be inexact. As described earlier, assumptions were therefore made about which unit costs from the UK publication should be used.

An alternative approach is to use out-of-pocket expenses for each country and then to use these to impute the 'true' costs. The WHO Global Health Expenditure Database provides the percentage of out of pocket expenditure in total health expenditure at an individual country level. Using these percentages, the out-of-pocket expenses collected in the 10/66 survey can be converted to estimated total costs. This 'percentage method' is used in sensitivity analyses. More details and results of this are shown in at Section 7.

*Ratios*

An alternative approach to measuring costs is to apply a ratio generated according to the GDP per capita for every county. This method was used in recent studies to

**Table 3.6b. CPI in World Economic Outlook Database (2002-2010)**

| Country | Subject Descriptor | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|---|---|---|---|
| China | Inflation, average consumer prices | 200.4 | 202.7 | 210.6 | 214.5 | 217.6 | 228.0 | 241.4 | 239.8 | 247.8 |
| | Inflation, end of period consumer prices | 105.5 | 108.4 | 111.9 | 113.4 | 115.7 | 123.4 | 126.5 | 127.4 | 133.4 |
| Dominican Republic | Inflation, average consumer prices | 125.0 | 159.4 | 241.4 | 251.5 | 270.5 | 287.1 | 317.7 | 322.3 | 342.7 |
| | Inflation, end of period consumer prices | 132.9 | 189.6 | 244.0 | 262.2 | 275.3 | 299.7 | 313.3 | 331.3 | 352.0 |
| India | Inflation, average consumer prices | 103.3 | 107.1 | 111.3 | 115.7 | 122.9 | 130.8 | 141.7 | 157.1 | 175.9 |
| | Inflation, end of period consumer prices | 105.0 | 108.0 | 113.0 | 119.0 | 127.0 | 134.0 | 147.0 | 169.0 | 185.0 |
| Mexico | Inflation, average consumer prices | 69.1 | 72.3 | 75.6 | 78.7 | 81.5 | 84.8 | 89.1 | 93.8 | 97.7 |
| | Inflation, end of period consumer prices | 71.0 | 73.8 | 77.6 | 80.2 | 83.5 | 86.6 | 92.2 | 95.5 | 99.7 |
| Peru | Inflation, average consumer prices | 100.5 | 102.8 | 106.6 | 108.3 | 110.5 | 112.4 | 118.9 | 122.4 | 124.3 |
| | Inflation, end of period consumer prices | 101.3 | 103.9 | 107.5 | 109.1 | 110.3 | 114.6 | 122.3 | 122.6 | 125.1 |
| United Kingdom | Inflation, average consumer prices | 95.4 | 96.7 | 98.0 | 100.0 | 102.3 | 104.7 | 108.5 | 110.8 | 114.5 |
| | Inflation, end of period consumer prices | 96.0 | 97.3 | 98.7 | 100.8 | 103.6 | 105.7 | 109.8 | 112.1 | 115.9 |
| Venezuela | Inflation, average consumer prices | 26991.7 | 35383.6 | 43078.4 | 49951.4 | 56771.9 | 67389.7 | 87856.1 | 111648.4 | 143119.2 |
| | Inflation, end of period consumer prices | 30225.9 | 38412.3 | 45781.7 | 52355.2 | 61237.9 | 74990.1 | 98162.0 | 122758.7 | 156129.3 |

Source: International Monetary Fund, World Economic Outlook Database, September 2010
http://www.imf.org/external/pubs/ft/weo/2011/02/weodata/index.aspx

estimate the worldwide cost of dementia (Wimo et al., 2006; Wimo and Prince, 2010; Wimo et al., 2007). The authors of these studies assumed there was a relationship between direct costs of medical care and GDP per person. These ratios were calculated for countries which had available data and were then used to estimate costs in other countries where dementia costs had not been calculated. In this thesis, this method is labelled the 'GDP ratio method' and it has the advantage of allowing direct comparisons with these previous studies. It was however deemed appropriate to focus on ratios based on comparative costs of health services, with the GDP ratio used in sensitivity analyses. More details and results are also described Section 7.

*PPPs*

PPPs are contained in the World Economic Outlook Database from the International Monetary Fund, WHO Global Health Expenditure Database, WHO-CHOICE database and in other resources. The first three provide similar results for those countries with available data. Information on PPPs from the CIA and the Foreign Agricultural Service of the United States differ markedly with these official figures, and are not appropriate for use in these analyses. As the International Monetary Fund database does not include information for Cuba and figures for only two years are contained in the WHO-CHOICE database, the PPPs in the WHO Global Health Expenditure Database were most useful for the analyses.

*Time issue*

The survey was conducted in seven countries at different times from the earliest interviews in Cuba in 2002 to the latest interviews in Mexico in 2007. The distribution of interview dates is shown in Table 3.7.

**Table 3.7. Interviewed date in the project countries**

| Countries | N | Earliest date of interview | Latest date of interview | Median of date of interview | Mode of interview year |
|---|---|---|---|---|---|
| China | 2162 | 28.8.2003 | 19.10.2005 | 19.8.2004 | 2004 |
| Cuba | 2944 | 26.5.2002 | 06.12.2006 | 28.9.2004 | 2004 |
| DR | 2009 | 22.12.2002 | 06.2.2006 | 12.3.2005 | 2005 |
| India | 2002 | 12.10.2003 | 15.7.2006 | 03.2.2005 | 2004 |
| Mexico | 2003 | 09.12.2005 | 01.12.2007 | 18.9.2006 | 2006 |
| Peru | 1932 | 19.8.2002 | 29.8.2007 | 18.10.2005 | 2005 |
| Venezuela | 1965 | 20.12.2003 | 17.11.2006 | 28.11.2005 | 2005 |
| Total | 15016 | 26.5.2002 | 01.12.2007 | 15.4.2005 | 2005 |

The WHO-CHOICE database only provided information for 2007 and 2008, and it was decided that all figures would therefore be converted to equivalent values for the year 2008. As data collection in all the countries extended beyond one year, the modal interview year in each country was assumed as the interview year for every participant in that country. Consequently, the costs directly collected in the survey were converted to the equivalent value for the year 2008 according to the CPI. This was not available from the World Economic Outlook Database for Cuba and so data from the International Labour Organisation Labour Statistics Database were used for that country.

**Calculation of private medical care costs (2008 prices)**

Private medical care costs are the out of pocket expenses paid by patients and families. As described earlier, this information was collected for the three-month period before the interviews. For calculating the annual cost of dementia, the use of health services in the previous three months was multiplied to four to estimate annual figures. This is based on an assumption that people tend to use health services at a stable rate, However, this may not always be the case. Some individuals may only have used health services once in a year, but it happened to be in the three months prior to the interview. There will also be some individuals who used health services in the past year, but not in the past three months. In this situation, a cost will not be measured for this person. From a population level, some costs are likely to be under-estimated, and some costs over-estimated. It is hoped that these discrepancies will balance out across the sample. Furthermore, current evidence (Albanese et al., 2011) shows recall is only reliable for relatively short periods, e.g. 3 months.

There are some outliers in the data relating to time spent receiving health services, travel time and number of visits. These data were truncated according to the 99% percentile for every service (see Tables 3.8a and 3.8b). The number of visits in the past three months was truncated according to the 99.5% percentile for each service, except for traditional healers where the truncation was at the 99.99% percentile (see Table 3.8c). That is because the distribution of the number of visits for traditional healers were extremely skewed and the 99.0% percentile was zero. Figures which are larger than these ranges are set to the maximum figures. This is a quite arbitrary

decision, the objective being to exclude extreme outliers that are more likely to reflect a component of measurement error biased towards and overestimation of true service use.

**Table 3.8a. Distribution of time spent in contact with health professionals (in minutes)**

| Time spent for health services | | Primary health centre | Hospital doctor | Other government health worker | Private doctor | Dentist | Traditional healer |
|---|---|---|---|---|---|---|---|
| Number | Valid | 14975 | 14975 | 14976 | 14977 | 14978 | 14977 |
| | Using the service | 3035 | 3019 | 626 | 2114 | 701 | 138 |
| | Missing | 47 | 47 | 46 | 45 | 44 | 45 |
| Mean | | 4.22 | 5.05 | 1.15 | 3.86 | 1.73 | .28 |
| Standard deviation | | 13.166 | 15.951 | 7.462 | 12.784 | 9.741 | 3.432 |
| Maximum | | 700 | 360 | 180 | 300 | 240 | 120 |
| 75% | | 0 | 0 | 0 | 0 | 0 | 0 |
| 90% | | 15.00 | 20.00 | .00 | 15.00 | .00 | .00 |
| 95% | | 20.00 | 30.00 | .00 | 30.00 | 7.10 | .00 |
| 99% | | 45.00 | 60.00 | 30.00 | 60.00 | 45.00 | 10.00 |

**Table 3.8b. Distribution of travel time (in minutes)**

| Transportation time | | Primary health centre | Hospital doctor | Other government health worker | Private doctor | Dentist | Traditional healer |
|---|---|---|---|---|---|---|---|
| Number | Valid | 14975 | 14975 | 14976 | 14977 | 14978 | 14977 |
| | Missing | 47 | 47 | 46 | 45 | 44 | 45 |
| Mean | | 3.79 | 6.18 | 1.05 | 5.55 | 1.26 | .29 |
| Standard deviation | | 60.6 | 17.3 | 7.6 | 22.1 | 8.4 | 4.1 |
| Maximum | | 5305 | 300 | 190 | 1440 | 480 | 240 |
| 75% | | 0 | 0 | 0 | 0 | 0 | 0 |
| 90% | | 10.00 | 20.00 | 0 | 20.00 | 0 | 0 |
| 95% | | 16.80 | 30.00 | 0 | 30.00 | 5.00 | .00 |
| 99% | | 45.00 | 90.00 | 30.00 | 90.00 | 30.00 | 10.00 |

**Table 3.8c. Distribution of number of visits in last 3 months**

| Number of visits in last 3 months | | Primary health centre | Hospital doctor | Other government health worker | Private doctor | Dentist | Traditional healer |
|---|---|---|---|---|---|---|---|
| Number | Valid | 14969 | 14968 | 14976 | 14972 | 14973 | 14977 |
| | Missing | 53 | 54 | 46 | 50 | 49 | 45 |
| Mean | | 0.56 | 0.55 | 0.22 | 0.30 | 0.11 | 0.02 |
| Standard deviation | | 2.054 | 2.175 | 2.077 | 1.232 | 0.741 | 0.484 |
| Maximum | | 90 | 96 | 90 | 48 | 24 | 42 |
| 75% | | 0 | 0 | 0 | 0 | 0 | 0 |
| 90% | | 2 | 2 | 0 | 1 | 0 | 0 |
| 95% | | 3 | 3 | 0 | 2 | 0 | 0 |
| 99% | | 7 | 8 | 5 | 4 | 3 | 0 |
| 99.5% | | 12 | 10 | 12 | 6 | 5 | 1 |
| 99.99% | | | | | | | 9 |

As the costs were collected in different national currencies in different years, they need to be converted using the CPI to the year 2008, and to be transformed by PPPs to international dollars. The CPIs to convert data from the interview year to 2008 in each country, and the PPPs for each country for 2008 are shown in Table 3.9.

To facilitate calculation, the conversion coefficients were calculated for the seven countries, see Table 3.9.

When calculating the costs in international dollars the following formula was used:

$$\text{Cost in I\$} = \frac{\frac{\text{CPI in 2008}}{\text{CPI in interview year}} \times \text{cost in local currency}}{PPP \text{ in 2008}}$$

The right hand side of the above can be rewritten as:

$$\text{Cost in I\$} = \text{Cost in local currency} \times \frac{\text{CPI in 2008}}{\text{CPI in interview year} \times PPP \text{ in 2008}}$$

The very right part in the formula is the conversion coefficient.

**Table 3.9. Conversion coefficient in 10/66 project countries and the UK**

| Conversion rate | China | Cuba | Dominican Republic | India | Mexico | Peru | UK | Venezuela |
|---|---|---|---|---|---|---|---|---|
| Interview year[1] | 2004 | 2004 | 2005 | 2004 | 2006 | 2005 | - | 2005 |
| CPI in interview year[2] | 105.1 | 105.9 | 230.5 | 115.2 | 131.8 | 110.1 | - | 255.0 |
| CPI in 2008[2] | 120.4 | 124.5 | 291.1 | 145.3 | 144 | 120.9 | 126.1 | 452.1 |
| PPP in 2008[3] | 3.822 | 1.357 | 19.431 | 16.217 | 7.47 | 1.507 | 0.639 | 1.873 |
| Conversion rate | 0.300 | 0.866 | 0.065 | 0.078 | 0.146 | 0.729 | - | 0.947 |

1 Based on mode for each country
2 From Table 3.6a, CPI in International Labour Organization Labour Statistics Database (2002-2010)
3 From Table 3.5b, PPPs in WHO Global Health Expenditure Database (2002-2010)

*Reporting of cost*

In this thesis, different types of direct medical cost are displayed separately, and all types of direct non-medical costs are summed. The value of time spent by carers to enable the participant to receive treatments is also combined with out-of-pocket cost. All the time spent used the medical service was added together. The indirect cost was not broken down and treated as a whole. The income of the carers collected in the survey was treated as the unit cost at the private level. More details of this are described in section 3.2. The process of calculating the cost of medical care is summarised in the following flow chart (Figure 1).

**Calculation of public medical care costs (2008 prices)**

Country specific unit costs were estimated according to the following steps:

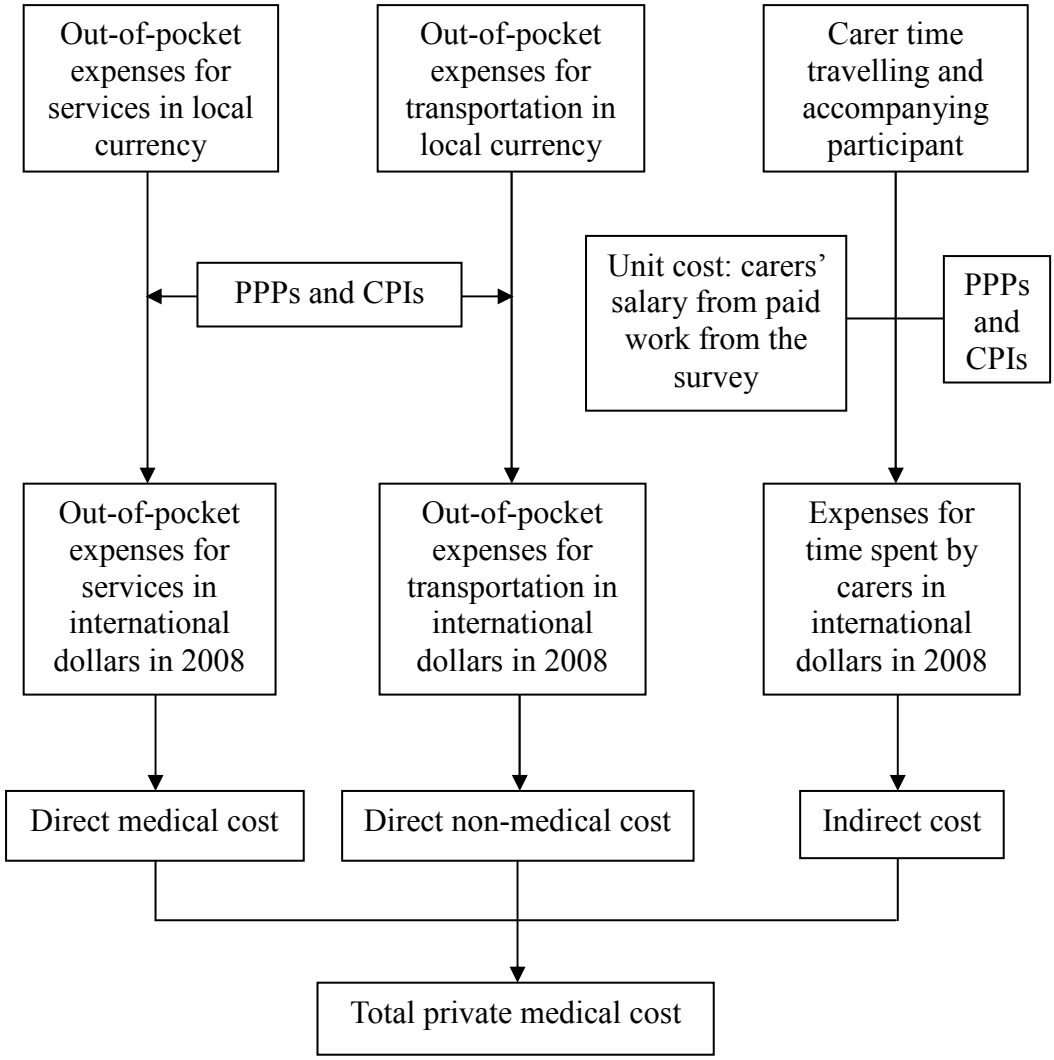
Step 1: UK unit costs for different services in 2008 were obtained from the PSSRU annual publication and from the NHS Reference Costs for 2007-08, 2008-09. These costs were transformed into international dollars for the year 2008 using UK PPP rates (see Table 3.10).

**Table 3.10. Unit cost of health services in UK**

| Service types | 2008 (Pounds) | 2008 (I$)[3] |
|---|---|---|
| Government Primary care, per minute ( from GP services) | 2.7[1] | 1.7 |
| Prescriptions, per prescription ( from GP services) | 41[1] | 26.2 |
| Government hospital doctor, per minute[4] | 7.45[2] | 4.8 |
| Other government health worker, per minute in clinic | 0.87[1] | 0.6 |
| Inpatient care, per bed day | 371[2] | 237.1 |

1 From UK Unit Cost of Health and Social Care 2008
2 From NHS trust and Primary Care Trust combined database, 2007-08, 2008-09
3 PPPs from WHO Global Health Expenditure Database for UK in 2008 is 0.639.
4 It is assumed that each outpatient contact in public sector hospitals lasted for 20 minutes.

**Figure 1. Summary of private medical care cost calculation**



Step 2: The ratio between health costs in the UK and each country was calculated using information in the WHO-Choice database for 2008 (Table 3.11a). The explanations for each ratio have been described in the above text. In brief, the ratio for government primary care was generated based on the average cost of public health centre (no beds) and public health centre (with beds) in the outpatient services database of the WHO-Choice project. Urban and rural ratios were separately calculated. The ratio for government hospital doctor care was generated based on the average cost of primary-level hospital and secondary-level hospital in the same database. Urban and rural ratios were also separately calculated. The average of the ratio from the two services mentioned before was used for other governmental health workers. An average ratio of hospital service for each country was calculated based on the average cost of public, private and NGO inpatient services. As there is no information about urban and rural differences, the ratios were the same for urban and rural areas in each country.

**Table 3.11a. Ratios between the project countries and the UK, based on the WHO-Choice database**

| Country | Government primary care | Government hospital doctor | Other government health worker | Hospital services |
|---|---|---|---|---|
| China urban | 0.211 | 0.211 | 0.211 | 0.117 |
| China rural | 0.211 | 0.211 | 0.211 | 0.117 |
| Cuba urban | 0.149 | 0.149 | 0.149 | 0.073 |
| Dominican Republic urban | 0.382 | 0.383 | 0.383 | 0.164 |
| India urban | 0.111 | 0.111 | 0.111 | 0.048 |
| India rural | 0.111 | 0.111 | 0.111 | 0.048 |
| Mexico urban | 0.443 | 0.443 | 0.443 | 0.326 |
| Mexico rural | 0.443 | 0.443 | 0.443 | 0.326 |
| Peru urban | 0.280 | 0.280 | 0.280 | 0.173 |
| Peru rural | 0.280 | 0.280 | 0.280 | 0.173 |
| Venezuela urban | 0.394 | 0.394 | 0.394 | 0.277 |

From the above table it can be seen that for outpatient services (including government primary care, government hospital doctor and other government health worker), all ratios for each country are same (with the exception of very small differences for the Dominican Republic). The WHO-CHOICE database also does not enable a difference between urban and rural areas to be calculated. Therefore, the ratios can be simplified as shown in Table 3.11b.

**Table 3.11b. Simplified ratios between the project countries and the UK, based on the WHO-Choice database**

| Country | Outpatient service[1] | Inpatient service |
|---|---|---|
| China | 0.211 | 0.117 |
| Cuba | 0.149 | 0.073 |
| Dominican Republic | 0.383 | 0.164 |
| India | 0.111 | 0.048 |
| Mexico | 0.443 | 0.326 |
| Peru | 0.280 | 0.173 |
| Venezuela | 0.394 | 0.277 |

1 Includes government primary care, government hospital doctor and other government health worker

Step 3: These ratios are then applied to generate the unit costs for each country. These are shown in Table 3.12.

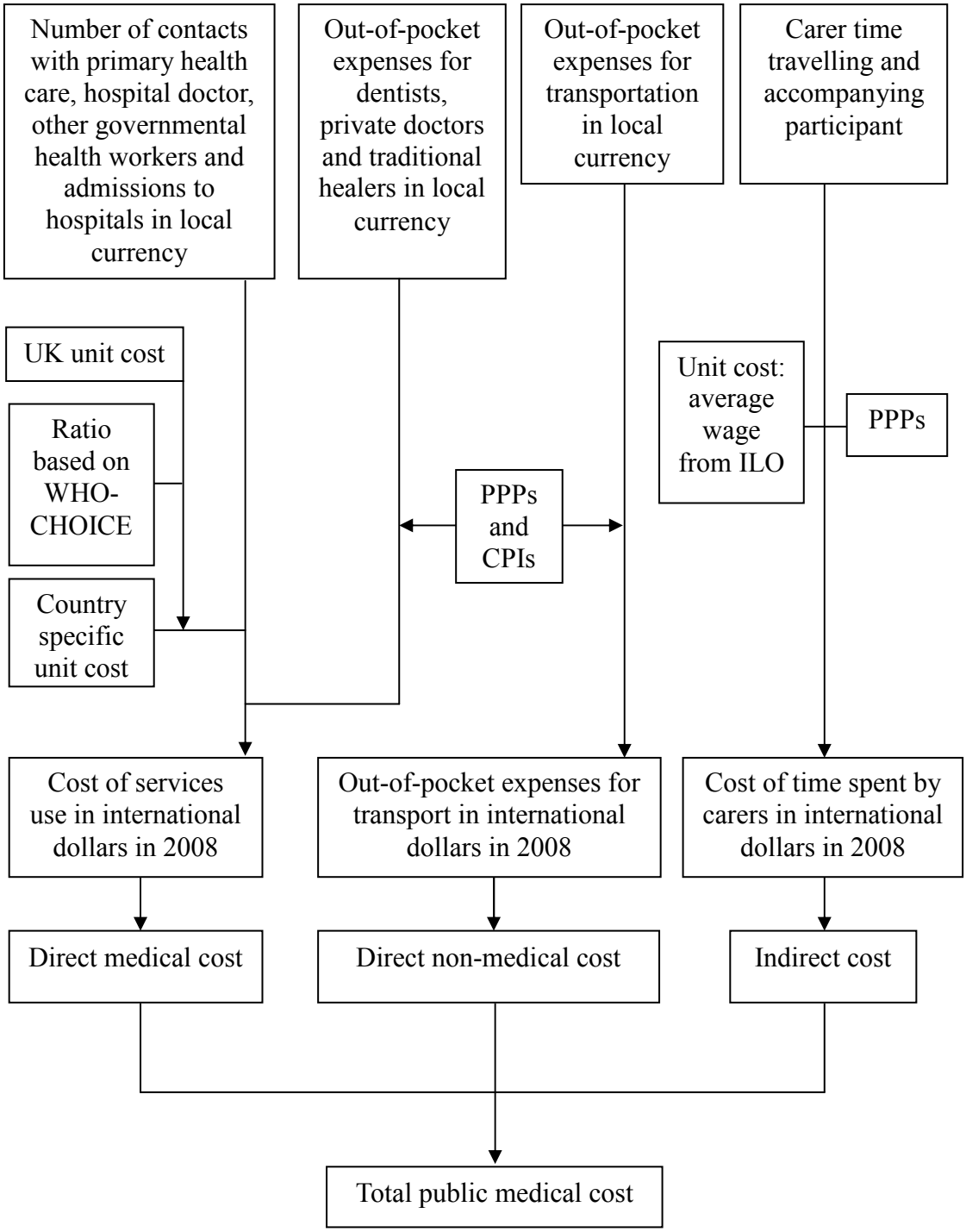
**Table 3.12. Country specific unit costs (in I$s) in 2008 (based on WHO-CHOICE ratio)**

| Service | China | Cuba | Dominican Republic | India | Mexico | Peru | Venezuela |
|---|---|---|---|---|---|---|---|
| Government Primary care, per minute | 0.36 | 0.25 | 0.65 | 0.19 | 0.75 | 0.48 | 0.67 |
| Prescriptions, per prescription | 5.53 | 3.90 | 10.03 | 2.91 | 11.61 | 7.34 | 10.32 |
| Government hospital doctor, per minute | 1.01 | 0.72 | 1.84 | 0.53 | 2.13 | 1.34 | 1.89 |
| Other government health worker, per minute in clinic | 0.13 | 0.09 | 0.23 | 0.07 | 0.27 | 0.17 | 0.24 |
| Inpatient care, per bed day | 27.74 | 17.31 | 38.88 | 11.38 | 77.29 | 41.02 | 65.68 |

The costs for primary health care, hospital doctor, other government health worker and admission to hospitals were calculated by using these unit costs, while the out-of-pocket expenditures for private doctors, dentists and traditional healers are assumed to represent the cost of these services. All the costs are subsequently summed to generate the total cost of health care.

The time spent by carers who accompanied the participant to hospitals or primary care centres was multiplied by the unit cost of their time to estimate the indirect cost of health care use. The unit cost of time spent by carers assumed to be equal to the average wage. This is described more fully in section 3.2. The process of calculating the cost of medical care is presented in the following flow chart (Figure 2).

**Figure 2. Summary of public medical care cost calculation**



**Process of generating the cost variables**

The cost of medical care was presented in four categories: direct medical cost, direct non-medical cost, indirect cost and total cost. The cost for direct medical care is the sum of the costs of each service. The direct non-medical cost is the total cost of transportation. The indirect cost is the loss of production by carers when helping the participant to use services. The total cost is the sum of direct medical cost, direct non-medical cost, and indirect cost. The direct medical costs were presented for each service. The direct non-medical costs and indirect costs were not broken down for each service.

All of the cost variables related to medical care were defined in the database (Table A2.1. and A2.2 in Appendix). For cost calculations, all the missing values (less than 0.4%) were changed to zero.

In summary, here is the process of generating the cost:

- Cost data including cost for services and cost for transportation were transferred to international dollars in the year of 2008 based on the conversion coefficients in Table 3.9, so as to generate the out of pocket expenses.
- Time spent for the services and transportation was presented in minutes. The amount of the time was multiplied by unit cost to generate the cost at public level.
- All the cost information was an average for each visit/use in 3 months. Therefore, cost or time spent was multiplied by the visit/use time for all types of cost for medical care, and also multiplied by the number of accompanied carers in indirect cost.
- For the information about hospital admissions and medicine, costs were converted to international dollars for the year 2008 based on the conversion coefficients in Table 3.9, so as to generate the costs in private level.
- In public level, the bed days in hospitals were multiplied with the unit cost to generate the cost for the three months period and then it was multiplied by four to generate annual costs.
- Cost for medicine was not included in public level calculation as it is assumed the prescription cost has been included in the unit cost of each service where

medicine could be prescribed.

## 3.2. Social care

As mentioned above, social care refers to care provided by unpaid family members (informal care) or paid home carers (non-professional home aids). This sub-section describes the identification, measurement and valuation of these costs.

**Cost Identification**

*Informal care*

Some participants with dementia need help with activities of daily living (ADLs), instrumental activities of daily living (IADLs) and supervision and these are mostly provided by family members. The ADLs in this survey refer to help with dressing, eating, grooming, toileting, and bathing. The IADLs include help with communication and transportation. In providing help, family carers may have to cut back or stop work, or reduce their own leisure time. Informal care refers to this care by unpaid family members, relatives or friends. It is assumed that the time spent providing care is firstly allocated from lost working days if the carer said they had cut back or gave up work. The remainder of the time is assumed to be allocated from leisure activities.

*Paid home care*

In some instances family members would also pay somebody else to provide help for the older person during the day or night. In this study 'paid home care' only refers to the care which the families paid for in order to obtain help with ADLs, IADLs or supervision. It does not include professional health workers' home visits, although these would be expected to be infrequent in the health systems studied.

*Loss of work time for participants*

The productivity losses of the older person because of retirement due to illness have not been identified in this study. Some participants may though have been able to work before they had dementia and stopped work because of dementia. Therefore the

total costs will be underestimated. However, studies show that very few people develop dementia before the age of 65 and after this age most people are retired. This study showed among participants with dementia, only 1.7% still had full-time paid jobs and 2.0% were in part-time work (Table 2.12). Therefore the productivity losses of the participants, while not zero, are considered to be very low.

*Impact on the health status of carers because of providing cares for dementia patients*

Evidence has shown that the prevalence of psychological morbidity among co-residents of people with dementia is higher than that for older people with other chronic conditions (Honyashiki et al., 2011). Therefore, the health impact on carers is an additional cost associated with dementia. However, it is not measured in this study. Estimating the cost of the emotional strain associated with caring is difficult (Meltzer, 2001) and it is hard to determine if poor health status of the carer is because of their relative's dementia or for other reasons. Again, therefore, this means that the total cost of dementia will be underestimated to some extent.

**Measurement of cost**

*Informal care*

Carers were asked to state the amount of hours spent helping with ADLs, IADLs and supervision in the preceding 24 hours. Results for ADLs and transportation were grouped into four categories, including no time, less than one hour, one to two hours, and more than two hours. The categorical variable was converted to a measure that could be used to generate costs (no time = 0, less than one hour = 1, one to two hours = 2, more than two hours = 3). Communication and supervision were assessed as number of hours per day with integer values between 0 and 24 accepted. .

In the study, carers were asked whether they had reduced or given up work. If this happened they were then asked for the hours per week they cut back on work or the time in months since they had stopped care. Information about carers' jobs and income was also collected. Apart from the main carer, time spent providing informal care by other relatives and their job types were also asked obtained from the survey.

*Paid home carer*

Two questions were asked to measure paid home care received during the day or night. For paid home care during the day, the respondents stated the frequency of care (none, occasional, regular, or constant). For paid home care during the night they stated the type of care (none, sleep-in paid help, or awaking paid help). There was no measurement of the actual hours spent by paid home carers and, therefore, some assumptions had to be made. For paid home care during the day time 'occasional' was assumed to be one day per week, 'regular' was assumed to be four days per week, and 'constant' was assumed to be seven days per week. A full day's work is assumed to be eight hours. The amount of paid home care during the night is assumed to be eight hours for both sleep-in paid and waking paid help. For night paid home care, it is assumed that the participants need the care every day, i.e., seven days per week.

**Valuation of costs**

The opportunity cost of time spent providing informal care is the value of lost working days or lost leisure time (McDaid, 2001). The value of supervision time may not be the same as the value of providing care. Therefore, there are four types of informal care cost to be valued: paid home care, working time, leisure time, and supervision time.

***Paid home care***

There were three options for determining the value of paid home care: collecting information from the survey, using a market price relating to each country, or using the minimum wage as an alternative price.

*Collecting information from the survey*

If the money paid for the paid home care had been collected in the survey, the value could be assumed to be equal to this amount. However, the 10/66 survey only collected the amount of the paid home care. No information on the expenditure for hiring a paid home carer was collected.

*Market price in different countries*

The value of paid home care can be determined as the market price of these services. However, no database was recognised as providing comparable information using the same methodology for all countries in the study. However, some indications of costs can be found from certain sources.

(1) International Labour Organisation (ILO)

The Department of Statistics of the ILO is responsible for labour statistics (LABORSTA), which play an important role for the development and evaluation of policies. The information in LABORSTA has been collected according to a high standard and can provide internationally comparable data on employment, unemployment, wages, hours of work, CPIs, occupational injuries, industrial disputes, household income and expenditure and international labour migration.

The wage database of LABORSTA provides annual wages in local currency by economic activity for most ILO member countries. However, the classifications for economic activities vary across the project countries, mainly using two categories developed by the United Nations in 1968 (UN 1968) and 1990 (UN 1990). Details are shown in Table 3.13.

As well as the standards varying across counties, the information provided in the database is not comprehensive for all counties. For example, data that can be used to value paid home carers are only provided for Cuba and Mexico in 1998 and for Venezuela in 1997 (see Table 3.14).

(2) Allo' Expat

Allo' Expat is a company offering information for people living in or moving to Malaysia, the Asia Pacific region, or beyond. Information provided by Allo' Expat includes data on international schools, 5 star hotels, hospitals, and restaurants. From their website the cost of hiring a maid are provided for most of the countries in the world. Table 3.15 summaries this information for seven countries in the 10/66 project. However, no information was available for Cuba and the Dominican Republic.

**Table 3.13. The classifications for economic activities in the wage database of LABORSTA**

| Standard | Categories | Source | Equivalent classification for paid home carers |
|---|---|---|---|
| UN 1990[1] | A: Agriculture, Hunting and Forestry<br>B: Fishing<br>C: Mining and Quarrying<br>D: Manufacturing<br>E: Electricity, Gas and Water Supply<br>F: Construction<br>G: Wholesale and Retail Trade; Repair of Motor Vehicles, Motorcycles and Personal and Household Goods<br>H: Hotels and Restaurants<br>I: Transport, Storage and Communications<br>J: Financial Intermediation<br>K: Real Estate, Renting and Business Activities<br>L: Public Administration and Defence; Compulsory Social Security<br>M: Education<br>N: Health and Social Work<br>O: Other Community, Social and Personal Service Activities<br>P: Private Households with Employed Persons<br>Q: Extra-Territorial Organizations and Bodies<br>X: Not classifiable by economic activity | United Nations: Statistical Papers, Series M, No. 4/ Rev. 3 (New York, 1990) | P: Private Households with Employed Persons |
| UN 1968[2] | 1. Agriculture, Hunting, Forestry and Fishing<br>2. Mining and Quarrying<br>3. Manufacturing<br>4. Electricity, Gas and Water<br>5. Construction<br>6. Wholesale and Retail Trade and Restaurants and Hotels<br>7. Transport, Storage and Communication<br>8. Financing, Insurance, Real Estate and Business Services<br>9. Community, Social and Personal Services<br>0. Activities not Adequately Defined | United Nations: Statistical Papers, Series M, No. 4, rev. 2 (New York, 1968) | 9. Community, Social and Personal Services |

Source: Department of Statistics, International Labour Organization

1 http://laborsta.ilo.org/applv8/data/isic3e.html;

2 http://laborsta.ilo.org/applv8/data/isic2e.html

**Table 3.14. Information provided in LABORSTA wage database for 7 countries**

| Countries | Wage classification standard | Wage categories provided in database | 2008 monthly wage for paid home carers |
|---|---|---|---|
| China | UN 1990 | A-N | No data |
| Cuba | UN 1968 | All categories | 385 Peso |
| Dominican Republic | UN 1990 | C-L | No data |
| India | UN 1968 | 2 and 3 | No data |
| Mexico | UN 1990 | All categories | 2401.1 Nuevo peso |
| Peru | UN 1990 | A-O | No data |
| Venezuela | UN 1968 | All categories, only in 1997 | No data |

Source: Department of Statistics, International Labour Organization, http://laborsta.ilo.org

**Table 3.15. Cost of hiring a maid in seven 10/66 project countries**

| Countries | Salary | Notes |
|---|---|---|
| China | 10-18 RMB per hour, 100-125 US $ per month | Some expatriates paying double, plus a Chinese New Year bonus |
| Cuba | No data | Salary consists of two components: a monthly fee paid to Cubalse and a dollar salary paid directly to the Cuban worker. |
| Dominican Republic | No data | The employer furnishes all meals, uniforms, linens and daily (public) transportation, if needed. Domestics who have been employed for a year expect a Christmas bonus of one month's salary. |
| India | 600 - 800 Rupees (US$ 15-20) per month | |
| Mexico | 4000 Pesos per month | The figure is from a post in the forum. |
| Peru | 150-200 US $ per month | 18% more for a full-time maid |
| Venezuela | Part time: 15,000 bolivares a day<br>Living in: US$ 250-300 per month | Bonuses are paid at Christmas and after a year of service. |

Source: Allo' Expat http://www.alloexpat.com

*Use of minimum wage to value paid care*

As no database can provide comparable information using the same methodology for all project countries, the use of an alternative price to represent the value of paid home carers may be more practical. Although the price for a domestic service may vary according to the experience of the carer and the needs of families, it can be assumed that the price cannot be lower than the minimum wage of that county. Therefore, the minimum wage in each project country can be used for the unit cost of paid home carers. This information can be found in a database released by

International Labour Organization. This of course may be an underestimate of costs as carers may receive more than the minimum wage.

The Conditions of Work and Employment Branch (TRAVAIL) is a department of the ILO. TRAVAIL provides information on wages, working time, work organisation and maternity protection. One of TRAVAIL's products is a Global Wage Database which provides a comprehensive overview of wage trends in ILO member countries. The database includes information on average monthly wages, low pay rates and monthly minimum wages. The monthly minimum wages obtained from the TRAVAIL wage database for all project counties are shown in Table 3.16.

**Table 3.16. Monthly minimum wages in local currencies, 2002-2009**

| Countries | Currency | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|---|---|---|---|
| China | Yuan | 432 | 458 | 527 | 573 | 657 | 720 | - | - |
| Cuba | Pesos | - | - | 100 | 225 | 225 | 225 | 225 | 225 |
| Dominican Republic | Dominican peso | 2240 | 2720 | 3900 | 3900 | 3900 | 4485 | 4485 | 5158 |
| India | Rupee | 1300 | 1300 | 1716 | 1716 | 1716 | 1716 | 2080 | - |
| Mexico | Pesos | 1033 | 1080 | 1125 | 1176 | 1223 | 1271 | 1322 | 1383 |
| Peru | Nuevo sol | 410 | 460 | 460 | 460 | 500 | 530 | 550 | 550 |
| Venezuela | Bolivar Fuerte | 190 | 247 | 321 | 405 | 512 | 615 | 799 | 968 |

Source: Conditions of Work and Employment Branch (TRAVAIL), International Labour Organization, http://www.ilo.org/travail/info/db/lang--en/index.htm

***Value of lost working time of carers***

There were three methods investigated to determine the value of lost working time of carers: using information collected in the survey, applying the opportunity cost method (friction cost approach or human capital approach), and applying the replacement cost method.

*Using information collected in the survey*

This method involved valuing working time of carers according to their income. In the survey, the carers were first asked if they had full-time or part-time paid work, were unemployed, students, were a full-time housewife/husband or were retired. They were then asked (if applicable) which kind of jobs they had. Finally, information on the income of the carers from difference sources was collected. These sources included government pensions, occupational pensions, disability pensions or benefits, money from families, income from rented land or property, income from paid work, and caregiver benefits.

Only if the carers had a full-time or part-time job would their income be affected by stopping or reducing work. Using individual income of the carers as the unit cost of working time reflects the impact at a personal level, but it may not reflect the economic burden at a societal level if the labour market does not function perfectly.

*Opportunity cost method*

The opportunity cost method focuses on what the individual foregoes if he/she cannot work. At a societal level, if the individual cannot work, then production will potentially be lost. There are two key ways to value lost production: the human capital approach and the friction cost approach.

*Human capital approach*

The human capital approach (HCA) assumes that lost production is equal to the lost income as a consequence of disease or, as in this case, caring responsibilities. It usually uses average wages to carry out this valuation. However, the HCA method may not reflect actual lost production because average wages are influenced by several factors, such as gender, profession, race and age. The same job may be done by different people but they may get paid different amounts. That will lead to different costs of lost production if the HCA is used (McCrone, 1998). Some economists have criticised the HCA method because it may over-estimate the impact of illness on production (Koopmanschap et al., 2008). The reason for this is that after a period of absenteeism, work may be taken over by others (colleagues, unemployed persons) or non-urgent work may be cancelled. Therefore, at a societal level, the real production losses for society may be smaller than the HCA assumes.

The ILO provides information on wages for its member countries and this can, therefore, be used for the HCA. Table 3.17 shows average monthly wages for the 10/66 countries between 2002 and 2009. However, information for Cuba was not available.

Average wages are also provided in the LABORSTA wage database. Information is displayed in Tables 3.18a to Table 3.18g for different occupations in seven of the project countries. However, the format of this information is not consistent across countries.

## Table 3.17. Monthly average wages in local currencies, 2002-2009

| Countries | Currency | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 |
|---|---|---|---|---|---|---|---|---|---|
| China | Yuan | 1031 | 1164 | 1327 | 1517 | 1738 | 2060 | 2436 | 2728 |
| Cuba | Pesos | - | - | - | - | - | - | - | - |
| Dominican Republic | Dominican peso | 5512 | 5825 | 7194 | 8144 | 8727 | 9644 | 10609 | 11000 |
| India | Rupee | 5536 | 5840 | 6230 | 6402 | 6823 | 7214 | 8466 | - |
| Mexico | Pesos | 4285 | 4560 | 4771 | 4920 | 5216 | 5549 | 5627 | 5745 |
| Peru | Nuevo sol | 1107 | 1120 | 1151 | 1034 | 1170 | 1170 | 1340 | - |
| Venezuela | Bolivar | 278817 | 308731 | 418603 | 560039 | 754641 | 952476 | 1265310 | - |

Source: Conditions of Work and Employment Branch (TRAVAIL), International Labour Organization, http://www.ilo.org/travail/info/db/lang--en/index.htm

## Table 3.18a. Average wages in local currency in China for different occupations

| Total men and women[1] | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 |
|---|---|---|---|---|---|---|---|
| Total | 1035.17 | 1170 | 1335 | 1530.33 | 1750.08 | 2077.67 | 2435.75 |
| A-B | 533.17 | 580.8 | 634.3 | 692.4 | 785.8 | 923.8 | 1079.83 |
| C Mining and Quarrying | 918.08 | 1140.17 | 1406.17 | 1718.83 | 2027.92 | 2364.75 | 2867.08 |
| D Manufacturing | 916.75 | 1041.33 | 1169.42 | 1313.08 | 1497.17 | 1740.33 | 2016 |
| E Electricity, Gas and Water Supply | 1370 | 1562.67 | 1817.08 | 2089.42 | 2397.08 | 2817.42 | 3267 |
| F Construction | 856.58 | 956.5 | 1064.17 | 1194.83 | 1367.17 | 1565.42 | 1793.92 |
| G-H | 783.17 | - | - | 1270.08 | 1478 | 1740.67 | 2128.17 |
| I Transport, Storage and Communications | 1337 | 1331.08 | 1531.75 | 1779.33 | 2051.92 | 2369.5 | 2733 |
| J Financial Intermediation | 1594.58 | 1871.42 | 2248.5 | 2685.67 | 3273.33 | 4119.58 | 5153.42 |
| K Real Estate, Renting and Business Activities | 1291.75 | 1431.83 | 1559.33 | 1715.08 | 1881.5 | 2202.08 | 2527.25 |
| L Public Administration and Defence; Compulsory Social Security | 1164.58 | 1294.42 | 1467.42 | 1708.75 | 1906.92 | 2347.58 | 2746.25 |
| M Education | 1107.5 | 1199.92 | 1356.42 | 1539.17 | 1761.17 | 2180.17 | 2515.42 |
| N Health and Social Work | 1232.92 | - | - | - | - | - | - |

1 Yuan per month
Source: Department of Statistics, International Labour Organization, http://laborsta.ilo.org

## Table 3.18b. Average wages in local currency in Cuba for different occupations

| Total men and women[1] | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 |
|---|---|---|---|---|---|---|---|
| Total | 261 | 273 | 284 | 330 | 387 | - | - |
| 1 Agriculture, Hunting, Forestry and Fishing | 254 | 276 | 297 | 332 | 387 | 420 | 444 |
| 2 Mining and Quarrying | 308 | 315 | 353 | 407 | 540 | 544 | 562 |
| 3 Manufacturing | 263 | 275 | 290 | 338 | 404 | 433 | 430 |
| 4 Electricity, Gas and Water | 319 | 314 | 339 | 398 | 496 | 508 | 517 |
| 5 Construction | 322 | 339 | 349 | 400 | 478 | 497 | 522 |
| 6 Wholesale and Retail Trade and Restaurants and Hotels | 213 | 225 | 230 | 280 | 334 | 353 | 365 |
| 7 Transport, Storage and Communication | 259 | 280 | 295 | 331 | 406 | 418 | 427 |
| 8 Financing, Insurance, Real Estate and Business Services | 296 | 317 | 332 | 402 | 477 | 493 | 445 |
| 9 Community, Social and Personal Services | 267 | 276 | 285 | 331 | 378 | 398 | 385 |

1 Peso per month
Source: Department of Statistics, International Labour Organization, http://laborsta.ilo.org

## Table 3.18c. Average wages in local currency in Dominican Republic for different occupations

| Total men and women[1] | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 |
|---|---|---|---|---|---|---|---|
| Total | 31.3 | 37.7 | 41.7 | - | - | - | - |
| C Mining and Quarrying | 48 | 41.5 | 26.1 | 32.9 | 34.7 | 35.1 | 38.5 |
| D Manufacturing | 29.4 | 32.7 | 50.8 | 81.1 | 85.4 | 85.4 | 86.1 |
| E Electricity, Gas and Water Supply | 34.9 | 51.4 | 39.4 | 44.8 | 47.4 | 53.9 | 54.7 |
| F Construction | 38.6 | 46.2 | 73.4 | 53.9 | 84.4 | 81.6 | 75.6 |
| G Wholesale and Retail Trade; Repair of Motor Vehicles, Motorcycles and Personal and Household Goods | 34 | 36.7 | 51.6 | 60.9 | 64.3 | 69.8 | 73.9 |
| H Hotels and Restaurants | 29.9 | 34.5 | 41.5 | 50.3 | 54 | 55.5 | 61.2 |
| I Transport, Storage and Communications | 32.6 | 37 | 35 | 42.6 | 46.4 | 51 | 56.5 |
| J Financial Intermediation | 48.3 | 69 | 48.2 | 62 | 62.3 | 64.9 | 74.5 |
| K Real Estate, Renting and Business Activities | 35.8 | 44.4 | 69.1 | 81.8 | 98.5 | 88.6 | 101.3 |
| L Public Administration and Defence; Compulsory Social Security | 36.8 | 44.6 | 45.5 | 59.1 | 62 | 62.8 | 71.1 |

1 Peso per hour
Source: Department of Statistics, International Labour Organization, http://laborsta.ilo.org

## Table 3.18d. Wages in local currency in India

| Total men and women[1] | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 |
|---|---|---|---|---|---|---|---|
| 3 Manufacturing | 1158.6 | 1078.9 | 1731.8 | 1234.4 | 3525.9 | - | - |

1 Rupee per month
Source: Department of Statistics, International Labour Organization, http://laborsta.ilo.org

## Table 3.18e. Average wages in local currency in Mexico for different occupations

| Total men and women[1] | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 |
|---|---|---|---|---|---|---|---|
| Total | 3553.5 | 3796.7 | 3969.7 | 4173.8 | 4425.9 | 4716.3 | 4800.9 |
| A-B | 1798.1 | 1990 | 2086.4 | 2271 | 2379.9 | 2522.9 | 2690.9 |
| C-Q | 3736.3 | 3972 | 4147.7 | 4346.2 | 4617.6 | 4898.3 | 4979.5 |
| A Agriculture, Hunting and Forestry | 1778.2 | 1953.5 | 2066.8 | 2229.9 | 2342.8 | 2494.1 | 2661 |
| B Fishing | 2956.8 | 3575.5 | 2959.4 | 3899.7 | 4013.5 | 4157 | 4379.1 |
| C Mining and Quarrying | 7249.6 | 8453.3 | 6919.4 | 8287.8 | 9509.1 | 10010.3 | 10580.4 |
| D Manufacturing | 3551.5 | 3752.6 | 3887.4 | 4140.3 | 4422.6 | 4689.2 | 4679.3 |
| E Electricity, Gas and Water Supply | 5375.9 | 5498.5 | 6235.4 | 5951.4 | 6689 | 7391 | 7151.7 |
| F Construction | 3388.3 | 3499 | 3754.2 | 3972.2 | 4278.1 | 4476.8 | 4750.5 |
| G Wholesale and Retail Trade; Repair of Motor Vehicles, Motorcycles and Personal and Household Goods | 3134.9 | 3363.9 | 3427.8 | 3726.7 | 3971.1 | 4154 | 4236.4 |
| H Hotels and Restaurants | 2830.4 | 2905.8 | 3071.2 | 3330.9 | 3519.4 | 3760.6 | 3893.2 |
| I Transport, Storage and Communications | 4146.8 | 4484.8 | 4678.5 | 4795.9 | 5151.9 | 5647.3 | 5854.9 |
| J Financial Intermediation | 7087.1 | 7099.4 | 7689.7 | 7773.7 | 8087.7 | 8876.9 | 8976.4 |
| K Real Estate, Renting and Business Activities | 4526.8 | 4721.3 | 5011 | 4658.1 | 5039.7 | 5155 | 5181.2 |
| L Public Administration and Defence; Compulsory Social Security | 4887.2 | 5246.7 | 5611.3 | 5812.4 | 6130.9 | 6498.4 | 6565.3 |
| M Education | 5016.3 | 5451 | 5620.5 | 5938.1 | 6267.7 | 6549.6 | 6640.9 |
| N Health and Social Work | 4961.9 | 5539.4 | 5578.7 | 5929.8 | 6315.7 | 6620.5 | 6741.2 |
| O Other Community, social and Personal Service Activities | 3313.9 | 3658.8 | 3899.1 | 4031.9 | 4150.6 | 4622.8 | 4556.4 |
| P Households with Employed Persons | 1649.7 | 1796 | 1847.8 | 1980.9 | 2167.7 | 2340.7 | 2401.1 |

1 Nuevo peso per month
Source: Department of Statistics, International Labour Organization, http://laborsta.ilo.org

**Table 3.18f. Average wages in local currency in Peru for different occupations (salaries employees in urban areas).**

| Total men and women[1] | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 |
|---|---|---|---|---|---|---|---|
| Total | 6.5 | 6.9 | 6 | 6.1 | 6.4 | 6.6 | 7.2 |
| A-B | 7.1 | 5.2 | 5.8 | 4.2 | 5.3 | 5.8 | 6 |
| C-Q | 6.5 | 7 | 6 | 6.1 | 6.4 | 6.6 | 7.2 |
| A Agriculture, Hunting and Forestry | 4.2 | 5.3 | 4.6 | 4.2 | 4.1 | 4.9 | 6 |
| B Fishing | 12.1 | - | - | - | - | - | - |
| C Mining and Quarrying | 17.4 | 17.4 | 18.4 | 26.9 | 17.3 | 16.6 | 20.7 |
| D Manufacturing | 11.4 | 10.6 | 9.8 | 6.4 | 8 | 7.9 | 9.1 |
| E Electricity, Gas and Water Supply | 10.5 | 14.3 | 9.5 | 12.1 | 9.1 | 13 | 12.7 |
| F Construction | 18.8 | 22.7 | 13.3 | 7 | 20 | 8.7 | 12.8 |
| G Wholesale and Retail Trade; Repair of Motor Vehicles, Motorcycles and Personal and Household Goods | 4.5 | 4.3 | 3.2 | 3.9 | 3.4 | 4.4 | 4 |
| H Hotels and Restaurants | 3.3 | 3.1 | 3.3 | 3.1 | 2.9 | 3 | 3.6 |
| I Transport, Storage and Communications | 8.2 | 7 | 5.1 | 5.4 | 6.1 | 5.6 | 5.9 |
| J Financial Intermediation | 15.7 | 15.8 | 8 | 9.8 | 12.8 | 10.6 | 11.7 |
| K Real Estate, Renting and Business Activities | 6.2 | 6.5 | 5.2 | 8.5 | 5.5 | 6.4 | 6.5 |
| L Public Administration and Defence; Compulsory Social Security | 5.8 | 6.6 | 6.8 | 6.4 | 7 | 7 | 8.2 |
| M Education | 5.9 | 6.9 | 6.6 | 6 | 7.5 | 7.6 | 7.9 |
| N Health and Social Work | 5.4 | 6.3 | 6.8 | 7.4 | 7 | 8.8 | 8.4 |
| O Other Community,Social and Personal Service Activities | 6.4 | 5.3 | 3.5 | 5.1 | 5 | 4.9 | 5.8 |

1 Nuevo sol per hour
Source: Department of Statistics, International Labour Organization, http://laborsta.ilo.org

**Table 3.18g. Average wages in local currency in Venezuela for different occupations**

| **Total men and women[1]** | **1997** |
|---|---|
| Total | 174424 |
| 1 Agriculture, Hunting, Forestry and Fishing | 100386 |
| 2 Mining and Quarrying | 107019 |
| 3 Manufacturing | 141122 |
| 4 Electricity, Gas and Water | 141003 |
| 5 Construction | 158942 |
| 6 Wholesale and Retail Trade and Restaurants and Hotels | 263500 |
| 7 Transport, Storage and Communication | 137729 |
| 8 Financing, Insurance, Real Estate and Business Services | 156988 |
| 9 Community, Social and Personal Services | 104504 |

1 Bolívar per month
Source: Department of Statistics, International Labour Organization, http://laborsta.ilo.org

As the LABORSTA provided average wage rates for many occupations it is important to match these with the job information of carers recorded in the 10/66 study. However, the classifications used in the UN system differ from that used in the 10/66 study. As Table 3.19 shows, only agricultural workers in the 10/66 study can be matched directly with a UN category (i.e. the category of agriculture, hunting and forestry).

**Table 3.19. List of job type in 10/66 study**

| 10/66 job type | UN 1990 occupation category | UN1968 occupation category |
|---|---|---|
| Manager/administrator | Not matched | Not matched |
| Professional (eg health, teaching, legal, financial) | Not matched | Not matched |
| Associate professional (eg technical, nursing, artistic) | Not matched | Not matched |
| Clerical worker /secretary | Not matched | Not matched |
| Shop keeper | Not matched | Not matched |
| Skilled labourer (e.g building, electrical etc.) | Not matched | Not matched |
| Semi-skilled labourer (e.g helper of skilled labourer) | Not matched | Not matched |
| Unskilled labourer | Not matched | Not matched |
| Agricultural worker | A Agriculture, Hunting and Forestry | 1 Agriculture, Hunting, Forestry and Fishing |

Although the job information cannot be matched between the LABORSTA database and the 10/66 survey, the average income can be calculated for each occupation in every country and this information may be valuable for cost estimation.

*Friction cost approach*

The second way to estimate the loss of production is the friction cost approach. The idea of the friction cost approach is that when work is lost there might be another person to take over. In this method, the value of lost working days is confined to the period during which labour is replaced (Koopmanschap et al., 2008). However, this method is challenged by other researchers (Johannesson and Karlsson, 1997). They suggest that the assumptions used in the friction cost approach are not supported by neoclassical economic theory, because if no additional workers need to be hired by a company, but the company still can insure the same production, the original profits were not maximised. Another problem is that it is unlikely that the person replacing the lost worker was previously unemployed. If they are recruited from another job then there may be another friction cost (and there may be a large number of them).

*Replacement cost method*

The replacement cost approach values informal care based on what one would have to pay to replace the carers if they were not available. In this survey, it was assumed that if the carers went to work rather than providing care, then they would have to hire paid home carers to provide care. Therefore, the cost for a paid home carer can be used as a proxy value for the lost working time of the carers. The value of paid home carers has been discussed in the former section.

***Leisure time of the carers***

Two options for valuing leisure time in monetary terms were considered. The first was to assume that the value of leisure time corresponds to the wage rate according to neoclassical labour theory. This assumes that leisure time is of equal value to work time. This method has been criticised for implying that a person who earns more from employment has more valuable leisure time than a person who earns less (Sendi and Brouwer, 2004). Furthermore, the neoclassical theory suggests that if a person is unemployed this implies that they have made that decision because the value of their leisure time is higher than the wage rate they would gain from employment (Shaw, 1992). However, if we approach this issue from a societal level by using the average wage to represent the unit cost of leisure time then these weaknesses may be overcome to some extent.

An alternative is to use the replacement cost method where the price of a professional such as a home care worker is used as a proxy for informal care. Although in developing countries, it may not be possible to hire a home care worker, this may still reflect the value of the care provided.

Some economists also suggest that leisure time should be valued as part of an individual's Quality-adjusted life year (QALY) gain, rather than in a monetary format. However, this approach was not possible in this study as QALYs were not measured.

***Supervision time***

Supervision is an important aspect of informal care for people with dementia. As

mentioned before, the value of supervision time may not be equivalent to the value of actually providing care. During supervision a carer may still carry out other activities. For example, a carer can supervise a person with dementia in order to prevent them leaving the house while watching television or cooking food. In this respect the carer is performing multiple activities during the same time period. As a result of the above reasoning, time spent in supervision may be assumed to be equal to a percentage of the value for time spent for help for ADLs.

**Calculation process in this thesis**

*Paid home care*

No information was collected in the 10/66 study on paid home care and, therefore, assumptions have been made for these unit costs. Data available from the ILO on the average wage for different occupations is not comprehensive for all of the project countries. The information from Allo 'Expat is not an official figure and its appropriateness is unclear. As was stated above, it may be assumed that a paid home carer cannot be paid less than the minimum wage of a country. As such, the minimum wage can be used as the unit cost of a paid home care worker. The TRAVAIL database of the ILO provides this information. In order to calculate the cost for the year 2008, the minimum wage for 2008 for each project countries, except China, was used. For China, the figure for 2007 was inflated according to the CPI of 2007 and 2008. The minimum wage in China in 2007 was 720 Yuan. According to Table 3.6a, the CPI in 2007 and 2008 in China was 113.7 and 120.4 respectively. Therefore the estimated minimum wage in 2008 in China is 762 Yuan. All of the information provided in wage database is in local currencies and so these were converted to international dollars according to PPPs (shown in Table 3.9). Table 3.20 shows the minimum wages in different counties in 2008.

**Table 3.20. Monthly minimum wages in project different counties in 2008**

| Countries | Local currency | | PPPs in 2008 | International Dollars in 2008 |
|---|---|---|---|---|
| | Currency | amount | | |
| China | Yuan | 762 | 3.822 | 199 |
| Cuba | Pesos | 225 | 1.357 | 166 |
| Dominican Republic | Dominican peso | 4485 | 19.431 | 231 |
| India | Rupee | 2080 | 16.217 | 128 |
| Mexico | Pesos | 1322 | 7.470 | 177 |
| Peru | Nuevo sol | 550 | 1.507 | 365 |
| Venezuela | Bolivar Fuerte | 799 | 1.873 | 427 |

*Time spent by the carers*

For carers with full-time or part-time jobs, time spent providing care was first valued as lost working time. The remainder of the time was treated as leisure time. For those without paid work, all of the time was treated as leisure time.

As with the calculation of medical care costs, the unit cost for working time was defined according to different perspectives. At the private level the unit cost of time was based on data collected directly from carers based on their own wage. At the public or societal level, carer time was valued using average wage.

For the unit cost of working time, the HCA was applied. The reason for this is that the HCA is the most widely used method to estimate the value of lost work time and average wages are routinely available from international databases. The friction cost approach is difficult to use, partly because the period of friction is hard to determine and value. The replacement cost approach may not be suitable for developing countries as most of the care will only ever be provided by family members rather than paid home carers.

In terms of average wages, the TRAVAIL database provides comparable information for project countries except Cuba in local currencies, while the information provided by the LABORSTA database is not comprehensive. However, wage information is available for Cuba in the LABORSTA database. Therefore, in the calculations wage information is firstly based on the TRAVAIL database with the LABORSTA database used for Cuba. The figures in 2008 have been used in the analyses and figures converted to international dollars according to PPPs. Average income calculated from the survey was also used and two methods were compared. However, as the 10/66 study was a population-based community survey with a large sample size, the average wage from the survey can be used as the unit cost in HCA approach. Moreover, the average wage can also be calculated for different occupations, which may provide a more precise estimation of the wage for carers with different jobs. This method is called the '10/66 salary method' and will be addressed through sensitivity analyses in Section 7. The replacement cost method is similarly addressed using sensitivity analyses and these are reported in Section 7.

The opportunity cost method was used for valuing the loss of leisure time by carers rather than the replacement cost approach which (as stated above) may not suitable for developing countries. In the base case calculations, the loss of leisure time was valued the same as for lost work time. However, the value of loss of leisure time may be lower or higher than the value of lost work time. An individual is assumed to always seek maximum benefit (or satisfaction) from the activity he or she is carrying out (Sendi and Brouwer, 2004). The selection is influenced by the person's budget. If the person requires a lower budget for general expenditure, he or she will choose to spend relatively more time on leisure activities rather than doing work. In this case, the value of leisure time can be considered higher than that of working time. In contrast, if the person does not have enough money, he or she will have to choose to work and in this scenario, the value of leisure time is lower than that of working time. Therefore, in sensitivity analyses, 50% and 150% of the value of working time was used. This method of applying different values to leisure time is termed the 'leisure time method' in this thesis and will be addressed in sensitivity analyses

Supervision is clearly an important component of the care process for elderly people, especially for those with dementia. Although supervision can be carried out at the same time as other carer activities, the production and benefits of supervision can not be ignored. Therefore, in this thesis, it is assumed that the value of supervision time is the same as caring time.

The costs of time spent providing care and supervision by family members are added together to estimate total informal care costs. The value of carer time was calculated according to the employment status of the carers for private level costs, while the average wage was used as the unit cost in public level costs. In sensitivity analyses, the unit costs are determined differently according to the loss of work time and the loss of leisure time. Caring time was firstly allocated to loss of work time and valued by the unit cost mentioned above. The reminder of the time was determined as loss of leisure time and was valued by 50% and 150% of the value of working time which has been described before.

Table 3.21 shows the average wages in 2008 according to the TRAVAIL wage database and (for Cuba) the LABORSTA database. The figure for Cuba was only available in 2006, and so this was converted using the CPI to the year 2008. The

average monthly wage in 2006 for Cuba was 387 Peso. According to Table 3.6a, the CPI in 2006 and 2008 in Cuba was 114.5 and 124.5 respectively. Therefore, the estimated average monthly wage in 2008 in Cuba is estimated at 421 Peso. All of the information provided in wage database is presented in local currencies, and these were converted to international dollars according to PPPs (see Table 3.9).

**Table 3.21. Monthly average wages in different counties in 2008**

| Countries | Local currency | | PPPs in 2008 | International Dollars in 2008 |
|---|---|---|---|---|
| | Currency | amount | | |
| China | Yuan | 2436 | 3.822 | 637 |
| Cuba | Pesos | 421 | 1.357 | 310 |
| Dominican Republic | Dominican peso | 10609 | 19.431 | 546 |
| India | Rupee | 8466 | 16.217 | 522 |
| Mexico | Pesos | 5627 | 7.470 | 753 |
| Peru | Nuevo sol | 1340 | 1.507 | 889 |
| Venezuela | Bolivar Fuerte* | 1265 | 1.873 | 676 |

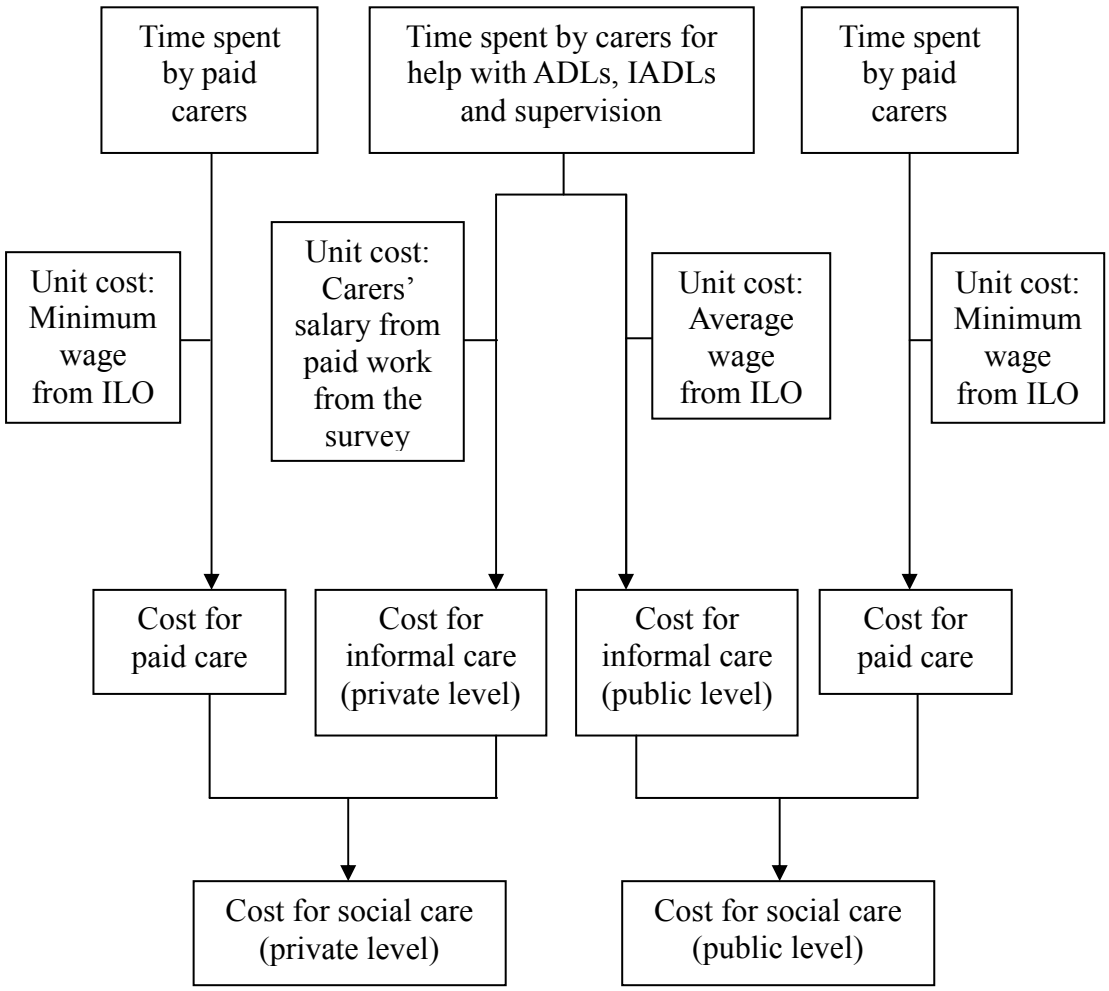
* Venezuelan Bolivar Fuerte = 1000Venezuelan Bolivar

However, Table 3.21 only shows the monthly average for a country as a whole. Evidence has shown that the average wage for women is lower than that for men (Wimo and Prince, 2010). Furthermore, as shown in Table 2.15, 77.4% of carers are of working age in the sample as a whole, ranging from 54.5% in urban China to 96.3% in rural India. People who are not in working age may not be economically active(Wimo and Prince, 2010), so they may have a low value of the productivity loss. As the 10/66 study can provide information on the proportion of female/male carers and the percentage of carers who are not of working age, two sensitivity analyses can be carried out according to these characteristics (gender and age) of the carers. This method is called ‘carers characteristics method’ and more details and results are described in Section 7.

Finally, consideration has been made for the provision of informal care from people other than the main caregiver. Main caregivers were asked if there were other persons in the family providing informal care and if so how many hours they provided per week. In addition, the number of weeks of lost work in the past three months of these other caregivers was also recorded. This method considering the cost of other informal care was termed the ‘all informal care method’ and is discussed in Section 7.

The process of calculating the cost of social care in the base case is presented in the following flow chart (Figure 3).

**Figure 3. Summary of cost calculation for social care in private and public level**



**Process of generating the cost**

The cost of social care was divided into two main categories: informal care and paid home care. The cost of informal care included cost of help for ADLs, IADLs, and supervision. Cost for ADLs was the total cost of five activities (dressing, eating, grooming, toileting, and bathing), and the cost for IADLs was the sum of the cost for transportation and communication.

All of the cost variables related to social care were defined in the database (see Table A2.3 in Appendix). For cost calculations, all the missing values were changed to zero. Sometimes the total hours per day were greater than 24 and these were therefore truncated at 24. As described earlier, time spent providing help for each ADL category and transportation could be no more than three hours. Therefore, the sum of all time spent in one day for the five ADLs and transportation could be no more than 18 hours. Allocating the remaining hours for communication and supervision was according to their distribution. Time spent in a day was multiplied by 365 to generate hours in a year.

The unit cost of time spent by carers was the monthly wage. Therefore, carer time needed to be converted to equivalent months. It was assumed that in a month there would be 160 hours of work. According to this assumption, hours spent in one year were changed to working months in a year, and were multiplied by the unit cost.

At the private level, the unit cost of carer time was the monthly wage of paid work of the carers. Information on monthly wages of the carers was collected in the survey and converted to international dollars based on the figures in Table 3.9. At the public or societal level, the unit cost of carer time was the average wage in each project country. For paid home care, the costs were the same for the private and public levels. The amount of paid home care was multiplied by the unit cost to estimate the total cost of paid home care.

## 3.3 Total cost

Total cost was the sum of the costs of medical care and social care. It was presented

both at private level and public level.

## Summary of section

The identification, measurement and valuation of the costs of medical care and social care have been discussed in this section. Costs both at the private level and public level were estimated separately for a whole year. The amount was converted to international dollars for the year 2008 based on PPPs and CPIs.

The costs of medical care were divided into direct medical costs, direct non-medical costs and indirect costs. Information of health service utilisation in the past three months was collected. Costs of medical care at the private level were the out-of-pocket expenses for the services and real income lost by the caregivers when accompanying the participants when they used services. Costs of medical care at the public level for services publically provided was valued according to the UK unit cost method based on ratios generated from WHO-CHOICE database. The remaining services (private health care services) were valued in the same way as for the private level. The indirect costs of medical care at the public level were valued according to the average wage from the ILO.

Social care was divided into informal care and paid home care. Information on care provided for ADL, IADL, and supervision (informal care) during the past 24 hours, and paid home care in the past week was collected from the caregivers of the participants. The human capital approach was used to value the informal care based on the average wage from ILO. The minimum wage based on ILO estimations was used as the unit price of paid home care.

Some potential alternative methods have also been addressed. These form the basis of the subsequent sensitivity analyses.

# Section 4. Findings from the analysis of medical care and social care costs

This section reports the findings of the analyses described in section 3. The total cost among all participants is reported first, followed by the costs of medical care and social care and their components. For each area of cost, the first step is to describe the number of participants incurring costs. The second step is to describe the total cost and its distribution in relation to different characteristics: gender, age group, dementia status and the number of physical diseases (including hypertension, diabetes, ischemic heart disease, stroke and chronic obstructive pulmonary disease (COPD)). This is repeated for the separate categories of medical care and social care. Each cost will be presented from a private level and public level perspective.

## 4.1. Total cost

***Private level***

*Number of participants incurring costs across the sample*

The numbers of people with costs from a private level perspective among all the participants are shown in Table 4.1. Participants are highly likely to have expenditures on medical care. Most participants have direct medical cost in Cuba, Dominican Republic, Venezuela, urban Mexico, and urban China. Just over half of the participants in urban Mexico incur direct non-medical costs, followed by rural India and urban Peru, while the percentage is less than 1% in rural China. Indirect costs for carers incurred as a result of the participant using medical care occur for no more than 15% of participants in any centre. Private level social care costs are not frequently incurred in any country. There were no major differences between ADL, IADL and supervision costs among centres. Paid care costs at the private level were seldom incurred. They were most common in urban China, but only occurred for 7.2% of participants.

**Table 4.1. Number (%) of participants incurring costs at the private level, by site**

| Type of Cost | Cuba | Dominican Republic | Peru (urban) | Peru (rural) | Venezuela | Mexico (urban) | Mexico (rural) | China (urban) | China (rural) | India (urban) | India (rural) | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Medical care* | | | | | | | | | | | | |
| Direct medical cost | 2177 (73.9%) | 1402 (69.7%) | 407 (29.5%) | 98 (17.8%) | 1468 (74.7%) | 562 (56.0%) | 483 (48.3%) | 881 (75.9%) | 356 (35.5%) | 395 (39.3%) | 462 (46.2%) | 8691 (57.9%) |
| Direct non-medical cost | 291 (9.9%) | 536 (26.7%) | 559 (40.5%) | 118 (21.4%) | 574 (29.2%) | 524 (52.2%) | 326 (32.6%) | 161 (13.9%) | 8 (0.8%) | 189 (18.8%) | 421 (42.1%) | 3707 (24.7%) |
| Indirect for carers | 246 (8.4%) | 165 (8.2%) | 33 (2.4%) | 10 (1.8%) | 201 (10.2%) | 106 (10.6%) | 66 (6.6%) | 38 (3.3%) | 17 (1.7%) | 23 (2.3%) | 141 (14.1%) | 1046 (7.0%) |
| Any medical care cost | 2245 (76.3%) | 1466 (72.9%) | 722 (52.3%) | 166 (30.1%) | 1540 (78.4%) | 780 (77.8%) | 563 (56.3%) | 881 (75.9%) | 356 (35.5%) | 454 (45.2%) | 539 (54.0%) | 9712 (64.7%) |
| *Social care* | | | | | | | | | | | | |
| Informal care | | | | | | | | | | | | |
| ADL costs | 57 (1.9%) | 46 (2.3%) | 16 (1.2%) | 4 (0.7%) | 22 (1.1%) | 15 (1.5%) | 4 (0.4%) | 25 (2.2%) | 17 (1.7%) | 1 (0.1%) | 42 (4.2%) | 249 (1.7%) |
| IADL costs | 52 (1.8%) | 28 (1.4%) | 15 (1.1%) | 4 (0.7%) | 30 (1.5%) | 12 (1.2%) | 2 (0.2%) | 11 (0.9%) | 11 (1.1%) | 2 (0.2%) | 40 (4.0%) | 207 (1.4%) |
| Supervision costs | 25 (0.8%) | 11 (0.5%) | 16 (1.2%) | 4 (0.7%) | 25 (1.3%) | 8 (0.8%) | 2 (0.2%) | 1 (0.1%) | 4 (0.4%) | 2 (0.2%) | 7 (0.7%) | 105 (0.7%) |
| Informal care costs | 65 (2.2%) | 50 (2.5%) | 19 (1.4%) | 4 (0.7%) | 40 (2.0%) | 18 (1.8%) | 4 (0.4%) | 26 (2.2%) | 19 (1.9%) | 2 (0.2%) | 43 (4.3%) | 290 (1.9%) |
| Paid care | 35 (1.2%) | 41 (2.0%) | 45 (3.3%) | 2 (0.4%) | 29 (1.5%) | 4 (0.4%) | 1 (0.1%) | 83 (7.2%) | 1 (0.1%) | 0 | 0 | 241 (1.6%) |
| Any social care costs | 85 (2.9%) | 73 (3.6%) | 52 (3.8%) | 5 (0.9%) | 57 (2.9%) | 21 (2.1%) | 5 (0.5%) | 97 (8.4%) | 20 (2.0%) | 2 (0.2%) | 43 (4.3%) | 460 (3.1%) |
| *Total cost* | 2259 (76.7%) | 1477 (73.4%) | 752 (54.5%) | 167 (30.3%) | 1552 (79.0%) | 786 (78.4%) | 564 (56.4%) | 898 (77.4%) | 362 (36.1%) | 454 (45.2%) | 552 (55.3%) | 9823 (65.4%) |

*Average cost of care among participants at the private level*

Average medical care, social care and total care costs among all participants at the private level are shown in Table 4.2. The Dominican Republic has the lowest cost for medical care and urban China the highest. Urban India has the lowest costs of informal care and social care. Cuba has the highest informal care costs and urban China has the highest social care costs. The latter is accounted for by the relatively high cost for paid care in that site. No paid care was found in urban or rural India in this study. More information about the distribution of service use, informal care, and paid home care by dementia status is shown in Appendix (Table A1.1 to A1.3).

In the sample as a whole, the cost for medical care was around two-thirds of the total cost. Urban China has the highest cost for medical care and this clearly influences the proportion of total cost accounted for by medical cost across the whole sample. If data from urban China are not included, the ratio of medical care cost to social care cost is changed from 2:1 to 1.5:1. Most of the cost associated with medical care is due to direct cost. In the sample as a whole, costs for informal care and paid care are about same and cost associated with ADL consists of half of the cost of informal care.

However, these tendencies differ by country. Cuba, the Dominican Republic, urban Peru and rural Peru have higher costs for medical care compared with the cost for social care. The proportion of paid care is highly variable. This is clearly driven by the availability of paid carers. These are largely absent in rural sites, and only relatively widespread in urban China and urban Peru. Paid care costs are much more variable between sites than informal care costs. Moreover, the cost associated with ADL is a major component of the cost of informal care in the Dominican Republic and urban China, while it plays a less important role in Venezuela.

*Private level cost distribution by in participant characteristics*

Cost distributions at the private level by participant characteristics are presented in Table 4.3. Gender differences were minor for the whole sample. However, in the Dominican Republic and rural Peru women had much higher total costs than men, while in Venezuela and rural India men had costs that were about one-third higher than for women.

**Table 4.2. Annual mean and SD cost of care per capita at private level in 2008 international dollars, by site**

| Type of Cost | Cuba | Dominican Republic | Peru (urban) | Peru (rural) | Venezuela | Mexico (urban) | Mexico (rural) | China (urban) | China (rural) | India (urban) | India (rural) | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Medical care* | | | | | | | | | | | | |
| Direct medical cost | 118±324 | 19±78 | 265±2137 | 34±379 | 744±4976 | 369±1603 | 348±3608 | 2870±8685 | 181±1613 | 75±537 | 60±1038 | 439±3369 |
| Direct non-medical cost | 34±928 | 1.5±15.5 | 28±164 | 12±46 | 21±232 | 18±48 | 26±85 | 6.5±26.6 | 0.3±3.3 | 5.9±29.2 | 5.5±21.1 | 17±424 |
| Indirect cost for carers | 1.6±9.3 | 1.1±11.3 | 0.8±7.4 | 0.3±2.9 | 2.7±15.1 | 4.3±23.1 | 2.0±14.2 | 0.8±5.3 | 0.1±1.2 | 0.3±2.7 | 0.5±2.2 | 1.4±11.1 |
| Total cost of medical care | 154±984 | 21±84 | 294±2145 | 47±386 | 768±4990 | 391±1610 | 376±3626 | 2877±8694 | 182±1613 | 81±547 | 66±1050 | 458±3400 |
| *Social care* | | | | | | | | | | | | |
| Informal care | | | | | | | | | | | | |
| ADL costs | 82±763 | 54±561 | 70±1282 | 22±302 | 31±406 | 60±610 | 9.6±197.5 | 114±1071 | 25±266 | 2.5±78.6 | 26±154 | 52±675 |
| IADL costs | 42±491 | 15±196 | 31±526 | 8.7±121.0 | 43±402 | 46±639 | 2.0±45.3 | 26±426 | 16±218 | 2.1±47.6 | 8.8±56.1 | 26±380 |
| Supervision costs | 38±943 | 8.1±141.0 | 31±526 | 16±220 | 55±590 | 26±388 | 5.6±153.9 | 8.3±281.3 | 2.1±40.2 | 0.6±14.0 | 2.7±49.2 | 22±518 |
| Informal care costs | 161±1692 | 77±720 | 131±2203 | 47±619 | 129±1132 | 132±1198 | 17±311 | 148±1498 | 43±431 | 5.2±130.4 | 38±226 | 100±1246 |
| Paid care | 35±356 | 119±913 | 301±1767 | 44±738 | 103±1009 | 15±282 | 3.0±94.0 | 463±1683 | 3.3±105.6 | - | - | 103±905 |
| Total costs of social care | 196±1821 | 196±1294 | 432±3081 | 91±1014 | 232±1685 | 147±1233 | 20±325 | 611±2443 | 46±443 | 5.2±130.4 | 38±226 | 202±1664 |
| *Total cost* | 350±2076 | 217±1302 | 726±3730 | 138±1092 | 999±5292 | 538±2017 | 396±3639 | 3488±9164 | 228±1678 | 86±562 | 104±1075 | 660±3837 |

**Table 4.3. Annual mean and SD cost of care per capita at private level in 2008 international dollars for different participant characteristics, by site**

| Type of Cost | Cuba | Dominican Republic | Peru (urban) | Peru (rural) | Venezuela | Mexico (urban) | Mexico (rural) | China (urban) | China (rural) | India (urban) | India (rural) | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Gender* | | | | | | | | | | | | |
| Male | 293±2001 | 123±844 | 677±4460 | 84±667 | 1159±7662 | 530±2381 | 352±1918 | 3582±10692 | 240±1750 | 71±447 | 130±1549 | 674±4654 |
| Female | 381±2116 | 267±1483 | 754±3257 | 185±1358 | 837±3136 | 542±1808 | 425±4425 | 3418±7824 | 218±1620 | 81±477 | 82±351 | 640±3213 |
| *Dementia diagnosis* | | | | | | | | | | | | |
| Dementia | 1601±5069 | 1099±3012 | 3143±8621 | 931±3186 | 2920±10758 | 1209±2953 | 516±1755 | 8597±12783 | 768±1768 | 166±731 | 171±442 | 1887±6437 |
| Questionable and mild | 664±2001 | 509±1680 | 1702±3907 | 652±2399 | 2597±11818 | 1069±2902 | 504±1852 | 5475±7440 | 200±701 | 188±789 | 117±310 | 1107±4771 |
| Moderate and severe | 3096±7534 | 2770±4804 | 5866±13310 | 2922±6524 | 3741±7488 | 2071±3289 | 735±1190 | 14215±17768 | 2427±2782 | 62±140 | 1052±995 | 4188±9454 |
| Non-dementia | 196±1212 | 97±755 | 475±2650 | 83±735 | 846±4556 | 470±1885 | 384±3770 | 3089±8702 | 196±1668 | 80±546 | 95±1128 | 536±3443 |
| *Age group* | | | | | | | | | | | | |
| 65-69 | 239±1940 | 38±347 | 704±3992 | 89±666 | 682±2447 | 393±1545 | 579±6216 | 2666±8710 | 306±2283 | 77±499 | 72±352 | 500±3398 |
| 70-74 | 299±1245 | 56±500 | 586±4649 | 78±516 | 1029±4072 | 518±1736 | 241±880 | 3354±8957 | 119±580 | 78±500 | 64±253 | 597±3476 |
| 75-79 | 282±1192 | 215±1148 | 480±2158 | 196±1396 | 1784±10714 | 484±1384 | 364±2217 | 2827±5053 | 268±1825 | 88±417 | 55±195 | 676±4221 |
| 80+ | 578±3198 | 539±2155 | 1097±3443 | 226±1627 | 947±2817 | 738±3020 | 358±1364 | 5578±12713 | 179±668 | 138±942 | 336±2771 | 963±4461 |
| *Number of physical diseases* | | | | | | | | | | | | |
| 0 | 289±2409 | 75±770 | 591±3042 | 70±638 | 469±1783 | 421±2063 | 222±728 | 1672±6855 | 86±1010 | 53±376 | 53±246 | 332±2380 |
| 1-2 | 346±1438 | 205±1140 | 834±4507 | 154±1231 | 780±2814 | 603±1905 | 570±5429 | 3416±9204 | 425±2271 | 102±511 | 133±1487 | 708±3864 |
| 3+ | 650±2859 | 427±1965 | 833±3310 | 529±2196 | 1945±9596 | 714±2145 | 347±1212 | 6744±11342 | 1392±4159 | 485±1844 | 113±338 | 1395±6159 |

Dementia status was clearly related to total costs. In the sample as a whole, participants with dementia have costs that are 2.5 times higher than those without dementia. There was also a pronounced trend for increasing costs with greater dementia severity. The high variation indicates that the caring patterns are different across the sites. Further analyses were carried out to detect the main cause of the difference. The results showed that the variation across countries was mainly because of differences in the use of paid home care. Costs for informal care had similar distribution among dementia and non-dementia patients.

Total cost increases with age in most sites; exceptions being Venezuela, rural Mexico and rural China. Cost is also highly related to physical diseases. Participants with three or more physical diseases have higher average costs than those without any physical diseases. There was again a pronounced trend for costs to increase with the number of comorbid physical diseases. However, this tendency was not found in rural Mexico.

***Public level***

*Number of participants incurring costs across sample*

Table 4.4 shows the number and percentage of participants incurring costs from the public level perspective. Compared with the cost at the private level, fewer participants incurred public level medical care costs, mainly because medication is not included in the cost estimations at this level. Venezuela, Mexico, and rural India have relatively higher use of public level medical care. Public level medical care costs remain more likely to occur than social care costs in all countries. In all centres, participants have higher *direct* medical care costs than other components of medical care costs. Direct non-medical costs have the same distribution at the public level as at the private level. They are an important aspect of the total medical cost in urban Mexico, urban Peru and rural India, but not in rural China. The number of participants with indirect costs is higher at the public level than at the private level because of the different methods used to estimate the unit cost. Carers without paid work were assumed to not lose earnings in the private level estimations. However, carer time was costed at the public level regardless of whether the carer was losing work. This also affects the cost of social care. More participants have social care costs at the public level compared to the private level. Informal care costs occur more frequently in all centres at the public level than do paid care costs.

**Table 4.4. Number (%) of participants incurring costs at the public level, by site**

| Type of Cost | Cuba | Dominican Republic | Peru (urban) | Peru (rural) | Venezuela | Mexico (urban) | Mexico (rural) | China (urban) | China (rural) | India (urban) | India (rural) | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Medical care* | | | | | | | | | | | | |
| Direct medical cost | 1423 (48.3%) | 888 (44.2%) | 637 (46.1%) | 145 (26.3%) | 1048 (53.3%) | 720 (71.8%) | 620 (62.0%) | 454 (39.1%) | 63 (6.3%) | 357 (35.5%) | 527 (52.8%) | 6882 (45.8%) |
| Direct non-medical cost | 291 (9.9%) | 536 (26.7%) | 559 (40.5%) | 118 (21.4%) | 574 (29.2%) | 524 (52.2%) | 326 (32.6%) | 161 (13.9%) | 8 (0.8%) | 189 (18.8%) | 421 (42.1%) | 3707 (24.7%) |
| Indirect cost for carers | 738 (25.1%) | 564 (28.0%) | 353 (25.6%) | 92 (16.7%) | 726 (36.9%) | 462 (46.1%) | 367 (36.7%) | 249 (21.5%) | 41 (4.1%) | 305 (30.3%) | 393 (39.3%) | 4290 (28.6%) |
| Total cost of medical care | 1458 (49.5%) | 962 (47.8%) | 675 (48.9%) | 147 (26.6%) | 1178 (59.9%) | 751 (74.9%) | 651 (65.1%) | 455 (39.2%) | 64 (6.4%) | 369 (36.7%) | 546 (54.7%) | 7256 (48.3%) |
| *Social care* | | | | | | | | | | | | |
| Informal care | | | | | | | | | | | | |
| ADL costs | 205 (7.0%) | 183 (9.1%) | 118 (8.5%) | 22 (4.0%) | 74 (3.8%) | 69 (6.9%) | 52 (5.2%) | 152 (13.1%) | 46 (4.6%) | 21 (2.1%) | 84 (8.4%) | 1026 (6.8%) |
| IADL costs | 165 (5.6%) | 93 (4.6%) | 102 (7.4%) | 18 (3.3%) | 96 (4.9%) | 83 (8.3%) | 36 (3.6%) | 75 (6.5%) | 23 (2.3%) | 22 (2.2%) | 79 (7.9%) | 792 (5.3%) |
| Supervision costs | 84 (2.9%) | 39 (1.9%) | 91 (6.6%) | 14 (2.5%) | 88 (4.5%) | 48 (4.8%) | 24 (2.4%) | 16 (1.4%) | 8 (0.8%) | 17 (1.7%) | 17 (1.7%) | 446 (3.0%) |
| Informal care costs | 225 (7.6%) | 192 (9.5%) | 128 (9.3%) | 23 (4.2%) | 136 (6.9%) | 100 (10.0%) | 64 (6.4%) | 165 (14.2%) | 49 (4.9%) | 27 (2.7%) | 85 (8.5%) | 1194 (7.9%) |
| Paid care | 35 (1.2%) | 41 (2.0%) | 45 (3.3%) | 2 (0.4%) | 29 (1.5%) | 4 (0.4%) | 1 (0.1%) | 83 (7.2%) | 1 (0.1%) | 0 | 0 | 241 (1.6%) |
| Total costs of social care | 228 (7.7%) | 200 (9.9%) | 130 (9.4%) | 23 (4.2%) | 142 (7.2%) | 102 (10.2%) | 64 (6.4%) | 172 (14.8%) | 49 (4.9%) | 27 (2.7%) | 85 (8.5%) | 1222 (8.1%) |
| *Total cost* | 1583 (53.8%) | 1062 (52.8%) | 740 (53.6%) | 160 (29.0%) | 1245 (63.4%) | 776 (77.4%) | 670 (67.0%) | 536 (46.2%) | 97 (9.7%) | 387 (38.5%) | 572 (57.3%) | 7828 (52.1%) |

*Average cost among all participants at the public level*

Average medical care, social care and total costs among all participants at the public level are shown in Table 4.5. As with the private level, cost varies across centres, however the differences between countries are reduced. Rural China and India have the lowest costs for medical care and social care, while urban Peru, Venezuela, urban Mexico and urban China have relatively higher costs for both medical care and social care. In the sample as a whole, the cost for social care is about 3.5 times higher than the cost for medical care, which is quite different to the results at the private level where cost of medical care is higher. Most of the cost for medical care at the public level is due to direct medical costs. The costs for informal care are about eight times the cost of paid care. Again, this is very different compared with the results from the private level, where the two costs are similar.

All sites have higher costs for social care than for medical care, but variation is quite evident across the sites. Social care is much more important than medical care in urban China, urban India and rural China. Cost of social care is less different to the cost of medical care in Venezuela, and Mexico. The difference between the cost of paid home care and informal care is substantial in rural Mexico, rural China and urban Mexico, where the paid home care is seldom used. Paid care remains an important component (about 20%) of social care in urban Peru and urban China, and accounts for about 10% of the cost of social care in the Dominican Republic and Venezuela. No paid care was reported in India.

*Cost distribution in public level*

The distribution of costs by characteristics of the participants at the public level is shown in Table 4.6. The gender distribution of costs in the whole sample is similar to that found for the private level with very little difference between men and women. In rural Mexico and rural China women have lower total costs, while in other centres, men have higher total costs.

Dementia status is related to the total cost and greater severity of dementia is associated with higher costs. However, the ratio between dementia patients and non-dementia participants at public level is much higher than that at private level, with approximately a ten-fold difference in the sample as a whole. Variation also occurs among sites, ranging from a four- to six-fold difference in rural India and

**Table 4.5. Annual mean and SD cost of care at public level in 2008 international dollars, by site**

| Type of Cost | Cuba | Dominican Republic | Peru (urban) | Peru (rural) | Venezuela | Mexico (urban) | Mexico (rural) | China (urban) | China (rural) | India (urban) | India (rural) | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Medical care* | | | | | | | | | | | | |
| Direct medical cost | 96±212 | 159±488 | 312±1556 | 104±475 | 372±1376 | 441±1201 | 273±766 | 211±777 | 23±255 | 24±164 | 63±850 | 192±879 |
| Direct non-medical cost | 34±928 | 1.5±15.5 | 28±164 | 12±46 | 21±232 | 18±48 | 26±85 | 6.5±26.6 | 0.3±3.3 | 5.9±29.2 | 5.5±21.1 | 17±424 |
| Indirect cost for carers | 4.2±12.2 | 7.8±21.0 | 14±37 | 8.0±27.8 | 18±38 | 20±35 | 17±38 | 8.4±24.6 | 1.1±7.6 | 5.9±14.8 | 8.1±16.5 | 9.8±26.8 |
| Total cost for medical care | 134±960 | 169±502 | 354±1579 | 124±505 | 411±1415 | 478±1226 | 315±814 | 226±789 | 25±258 | 35±180 | 77±865 | 219±991 |
| *Social care* | | | | | | | | | | | | |
| Informal care | | | | | | | | | | | | |
| ADL costs | 293±1245 | 517±1946 | 803±2897 | 408±2170 | 209±1396 | 432±1893 | 383±1893 | 1132±3468 | 308±1762 | 155±1230 | 393±1364 | 442±1978 |
| IADL costs | 158±940 | 178±1218 | 392±1924 | 219±1729 | 289±1564 | 444±2153 | 157±995 | 347±2020 | 133±1167 | 60±458 | 128±476 | 225±1401 |
| Supervision costs | 101±829 | 113±1033 | 388±2317 | 192±1918 | 422±2487 | 349±2404 | 266±2417 | 120±1286 | 19±229 | 108±1087 | 44±522 | 194±1654 |
| Informal care costs | 552±2338 | 808±3320 | 1583±6010 | 819±4669 | 920±4243 | 1224±4797 | 806±4145 | 1600±5040 | 460±2714 | 324±2453 | 565±2006 | 861±3869 |
| Paid care | 35±356 | 119±913 | 301±1767 | 44±738 | 103±1009 | 15±282 | 3.0±94.0 | 463±1683 | 3.3±105.6 | - | - | 103±905 |
| Total costs of social care | 587±2471 | 927±3663 | 1884±6955 | 864±4842 | 1022±4563 | 1240±4818 | 809±4156 | 2062±6168 | 463±2717 | 324±2453 | 565±2006 | 964±4251 |
| *Total cost* | 721±2649 | 1096±3702 | 2238±7111 | 988±4895 | 1434±4824 | 1718±4997 | 1124±4365 | 2289±6342 | 488±2736 | 359±2465 | 642±2291 | 1183±4408 |

**Table 4.6. Annual mean and SD cost of care at public level in 2008 international dollars for different participant characteristics, by site**

| Type of Cost | Cuba | Dominican Republic | Peru (urban) | Peru (rural) | Venezuela | Mexico (urban) | Mexico (rural) | China (urban) | China (rural) | India (urban) | India (rural) | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Gender* | | | | | | | | | | | | |
| Male | 620±2831 | 905±3447 | 2054±6781 | 959±4560 | 979±3585 | 1702±5264 | 1245±4985 | 1884±5442 | 589±3322 | 361±2339 | 538±2350 | 1027±4151 |
| Female | 775±2545 | 1196±3826 | 2340±7290 | 1013±5176 | 1328±4484 | 1726±4861 | 1043±3903 | 2594±6934 | 406±2154 | 365±2587 | 728±2240 | 1232±4424 |
| *Dementia diagnosis* | | | | | | | | | | | | |
| Dementia | 4514±5593 | 5378±8354 | 14026±15641 | 6516±11376 | 8419±11769 | 7733±10736 | 4925±9539 | 15894±11615 | 5995±8951 | 2915±6902 | 2162±3640 | 6750±10154 |
| Questionable and mild | 1981±3569 | 2652±5072 | 9667±13965 | 5339±10916 | 5096±9321 | 6745±9680 | 4025±8713 | 11740±9730 | 2727±6640 | 2129±5684 | 1686±3023 | 4249±8192 |
| Moderate and severe | 8558±5852 | 13125±10630 | 22260±15454 | 15951±12477 | 16850±13167 | 13785±14525 | 15659±12760 | 23371±11095 | 16076±7758 | 12180±12604 | 9961±3788 | 14126±11644 |
| Non-dementia | 253±1431 | 510±1792 | 1013±3825 | 602±3815 | 877±3156 | 1103±3432 | 761±3283 | 1226±4167 | 162±1168 | 153±1485 | 458±1995 | 620±2745 |
| *Age group* | | | | | | | | | | | | |
| 65-69 | 328±2154 | 466±2532 | 966±4034 | 433±3078 | 746±3415 | 902±3096 | 812±4027 | 911±3601 | 233±2000 | 215±2151 | 422±1626 | 563±2939 |
| 70-74 | 429±1801 | 602±2323 | 1366±5277 | 710±3809 | 963±3440 | 1328±3621 | 827±3058 | 1421±5054 | 451±2584 | 461±2964 | 594±2104 | 798±3298 |
| 75-79 | 452±1849 | 918±3103 | 1872±6422 | 1708±6999 | 2009±5963 | 1197±3075 | 1131±4116 | 2059±5473 | 754±3672 | 350±2070 | 413±1490 | 1130±4237 |
| 80+ | 1645±3894 | 2278±5408 | 4668±10327 | 1490±5840 | 3368±7299 | 3569±8198 | 1853±5919 | 5831±9843 | 940±3192 | 600±2502 | 1565±4039 | 2637±6688 |
| *Number of physical diseases* | | | | | | | | | | | | |
| 0 | 507±2449 | 509±2741 | 1628±6443 | 680±4241 | 682±2385 | 1191±4121 | 718±3063 | 1034±4558 | 106±1028 | 358±2468 | 302±1480 | 663±3352 |
| 1-2 | 752±2512 | 1029±3639 | 2215±6713 | 1172±5394 | 1168±4442 | 2118±5700 | 1020±4156 | 2042±5833 | 1099±4134 | 359±2539 | 664±2505 | 1198±4340 |
| 3+ | 1508±3744 | 1993±4633 | 3956±9242 | 2106±6002 | 2041±5591 | 2236±5298 | 2203±6474 | 5108±8974 | 3095±6754 | 382±1853 | 1234±2755 | 2383±6052 |

Mexico, to a 36-fold difference in rural China.

Similar to the findings found at the private level, older participants have higher total costs than younger ones except in rural Peru. Cost is again highly related to the number of physical diseases in all centres.

## 4.2. Medical care

The number and percentage of participants using specific health services in the different countries is described in Table 4.7. Participants received care mostly from primary health centres and hospitals in all centres expect rural and urban India where private doctors were the most used service. Rural and urban Mexico and Cuba had the highest level of use of primary health centres, and rural China and urban India had the lowest use. For hospital doctors, use was quite similar across the centres, except rural Mexico, urban India and rural China, where hospital doctor services were used less frequently. Service use from other government health workers was generally lower than that from primary health centres and hospital doctors.

Contacts with private doctors were quite different across centres. Participants in Cuba, rural and urban China and rural Peru seldom saw private doctors, while in rural and urban India and Venezuela nearly one-third of participants and about one-fifth of those in Dominican Republic, rural and urban Mexico had visited private doctors in the last three months.

Participants in rural and urban China, and urban India occasionally visited dentists, while in urban Mexico, more than 10% of participants received dental services in the last three months. Rural and urban Mexico, rural Peru and rural India saw the greatest use of traditional healers, although even there the numbers were low.

The inpatient admission rate of participants was quite low compared to outpatient services, with the highest rate of 3.3% in Venezuela, and the lowest rates in rural Peru and rural China. The use of medication varied across centres. In general, except India, urban areas had higher use of medication.

**Table 4.7. Number (%) of participants using health services in the last 3 months, by site**

| Services type | Cuba (N=2944) | Dominican Republic (N=2011) | Peru (urban) (N=1381) | Peru (rural) (N=552) | Venezuela (N=1965) | Mexico (urban) (N=1003) | Mexico (rural) (N=1000) | China (urban) (N=1160) | China (rural) (N=1002) | India (urban) (N=1005) | India (rural) (N=999) | Total (N=15022) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Primary health centre | 1001 (34.1%) | 216 (10.8%) | 151 (10.9%) | 63 (11.4%) | 405 (21.0%) | 360 (35.9%) | 407 (40.7%) | 239 (20.6%) | 38 (3.8%) | 32 (3.2%) | 123 (12.3%) | 3035 (20.3%) |
| Missing values | 6 | 2 | 1 | 1 | 33 | 0 | 0 | 0 | 0 | 1 | 0 | 44 |
| Hospital doctor | 653 (22.2%) | 444 (22.1%) | 447 (32.4%) | 89 (16.2%) | 427 (22.1%) | 257 (25.6%) | 110 (11.0%) | 266 (22.9%) | 22 (2.2%) | 94 (9.4%) | 210 (21.0%) | 3019 (20.2%) |
| Missing values | 6 | 2 | 1 | 1 | 33 | 0 | 0 | 0 | 0 | 1 | 0 | 44 |
| Other government health worker | 185 (6.3%) | 32 (1.6%) | 38 (2.8%) | 5 (0.9%) | 129 (6.7%) | 60 (6.0%) | 44 (4.4%) | 2 (0.2%) | 1 (0.1%) | 7 (0.7%) | 123 (12.3%) | 626 (4.2%) |
| Missing values | 6 | 2 | 1 | 1 | 33 | 0 | 0 | 0 | 0 | 1 | 0 | 44 |
| Private doctor | 7 (0.2%) | 399 (19.9%) | 145 (10.5%) | 12 (2.2%) | 549 (28.4%) | 197 (19.6%) | 186 (18.6%) | 1 (0.1%) | 3 (0.3%) | 251 (25.0%) | 364 (36.4%) | 2114 (14.1%) |
| Missing values | 6 | 2 | 1 | 1 | 33 | 0 | 0 | 0 | 0 | 1 | 0 | 44 |
| Dentist | 173 (5.9%) | 86 (4.3%) | 87 (6.3%) | 12 (2.2%) | 148 (7.7%) | 116 (11.6%) | 35 (3.5%) | 12 (1.0%) | 0 | 2 (0.2%) | 30 (3.0%) | 701 (4.7%) |
| Missing values | 6 | 2 | 1 | 1 | 33 | 0 | 0 | 0 | 0 | 1 | 0 | 44 |
| Traditional healer | 13 (0.4%) | 5 (0.2%) | 5 (0.4%) | 5 (0.9%) | 12 (0.6%) | 17 (1.7%) | 32 (3.2%) | 3 (0.3%) | 0 | 2 (0.2%) | 44 (4.4%) | 138 (0.9%) |
| Missing values | 6 | 2 | 1 | 1 | 33 | 0 | 0 | 0 | 0 | 1 | 0 | 44 |
| Hospital inpatient | 61 (2.1%) | 59 (2.9%) | 31 (2.2%) | 3 (0.5%) | 64 (3.3%) | 20 (2.0%) | 14 (1.4%) | 28 (2.4%) | 4 (0.4%) | 10 (1.0%) | 17 (1.7%) | 311 (2.1%) |
| Missing values | 6 | 2 | 1 | 1 | 33 | 0 | 0 | 0 | 0 | 1 | 0 | 44 |
| Has used medicines | 2265 (77.1%) | 1409 (70.1%) | 897 (65.0%) | 243 (44.1%) | 1520 (78.7%) | 791 (78.9%) | 534 (53.5%) | 878 (75.7%) | 350 (34.9%) | 275 (27.4%) | 241 (24.1%) | 9403 (62.8%) |
| Missing values | 6 | 2 | 1 | 1 | 33 | 0 | 1 | 0 | 0 | 1 | 0 | 45 |

The average number of contacts with health services in the last 3 months among participants who used these services in each centre is shown in Table 4.8. Although the participants were relatively unlikely to use health services from other government health workers, the intensity of this service use was higher than for primary health centres and hospital doctors in Cuba, the Dominican Republic, urban Peru, and rural and urban Mexico. The data on this was not sufficient in rural Peru, rural and urban China, and urban India, as the numbers of people receiving help from other government health workers were too small.

The number of contacts with primary health centres was greatest in urban China followed by rural Peru. Participants in rural and urban India who used primary health centres did so at a lower frequency than in other countries. Participants in urban and rural Peru and urban China had the highest intensity of use of hospital doctors, while rural China and urban India had the lowest intensity. For services from private doctors, those in Cuba had most contacts. However, only 0.2% of participants used private doctors. Those in urban Peru used more dental services than those in other centres. While intensity of use of traditional healers was greatest in China, the numbers receiving this service were very small.

Average lengths of stay for those admitted to hospital were much longer in urban China than in other sites, with rural China ranked second. The participants in rural India had the shortest lengths of stay. This may be because the rules of the hospital were that, while treatment was free, a family member had to stay with the patient to provide food and personal care.

**Private level costs of medical care**

The direct medical costs, direct non-medical costs and indirect costs have been shown in Table 4.2. Details of the specific services that constitute direct medical care costs are shown in Table 4.9. In the sample as a whole, medication is the most important contributor to out-of-pocket costs. Visiting primary health centres and hospital doctors, and admissions to hospital also have high out-of-pocket direct medical care costs. However, there are country differences. Out-of-pocket expenses are very low in

Cuba and the Dominican Republic for every service. Urban China has the highest out-of-pocket cost for contacts with primary health centres, hospital doctors and admissions to hospital. Costs for dentists are very high in urban Peru and urban Mexico, while they are low in China and India. Costs for private doctor contacts are relatively high in Venezuela, urban Mexico and India, but lower in China. The costs for medication are the leading out-of-pocket costs in Cuba, Dominican Republic, urban Peru, Venezuela, Mexico and rural China.

The relationships between gender and direct medical costs, direct non-medical costs, indirect cost and total cost at the private level are shown in Table 4.10. Men have higher total costs for medical care at in the private level in the sample as a whole. Total costs do not differ much between the two groups in Cuba, the Dominican Republic, rural China and urban India. Men have higher total costs in rural Peru, Venezuela, urban Mexico, urban China and rural India; while women have higher costs in urban Peru and rural Mexico. The direct medical cost is higher among male participants in most of the counties except Cuba, the Dominican Republic and urban India. The gender difference is not clear for direct non-medical costs and indirect costs.

The age distribution of direct medical cost, direct non-medical cost, indirect cost and total cost at the private level is shown in Table 4.11. As with gender, there is not a large difference among the four age groups with regard to direct non-medical costs and indirect costs. For the whole sample, the direct medical costs and total medical costs initially increase with age and then decrease in later life. However, in urban Mexico, urban China and India, participants who are 80 and over have the highest direct medical cost and total cost. This trend is not observed in Peru and rural China, where the costs decrease with age. Cost does not seem to differ to any great extent among different age groups in the Dominican Republic.

The difference in cost between participants with and without dementia is described in Table 4.12. In the sample as a whole, participants with dementia have slightly higher direct medical and total costs than those without dementia. Those with moderate or severe dementia have higher costs than those in other categories. The differences between the two groups (dementia, non-dementia) and between different severities of dementia are small in Cuba, the Dominican Republic, rural Peru, rural Mexico, and

**Table 4.8. Mean and SD number of contacts by those using health services in the last 3 months, by site**

| Services type | Cuba | Dominican Republic | Peru (urban) | Peru (rural) | Venezuela | Mexico (urban) | Mexico (rural) | China (urban) | China (rural) | India (urban) | India (rural) | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Primary health centre | 3.2±4.4 | 2.8±4.2 | 2.9±2.7 | 3.8±6.3 | 2.1±2.2 | 2.3±1.6 | 2.5±4.9 | 4.0±4.2 | 2.0±1.6 | 1.7±1.6 | 1.5±1.2 | 2.8±3.8 |
| Missing values | 0 | 0 | 2 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 |
| Hospital doctor | 2.6±3.4 | 2.8±3.8 | 3.4±4.3 | 3.4±3.7 | 2.4±2.4 | 2.7±4.9 | 2.3±3.2 | 3.4±8.3 | 1.6±1.0 | 1.7±2.2 | 1.9±1.8 | 2.7±4.2 |
| Missing values | 0 | 0 | 4 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 |
| Other government health worker | 9.4±11.0 | 5.5±5.9 | 4.2±5.9 | 6.0±10.1 | 2.3±3.0 | 3.7±5.5 | 8.1±16.0 | 20.5±27.6 | 1 | 1.9±0.7 | 2.0±3.8 | 5.2±8.8 |
| Missing values | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Private doctor | 4.0±3.8 | 2.0±2.4 | 2.9±2.6 | 1.3±0.5 | 2.3±3.4 | 2.0±2.4 | 2.1±2.3 | 20 | 3.0±2.0 | 1.8±2.1 | 1.8±2.1 | 2.1±2.6 |
| Missing values | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 4 |
| Dentist | 2.0±2.5 | 2.3±2.0 | 3.6±3.7 | 3.1±3.4 | 2.4±2.3 | 2.4±2.5 | 1.9±1.5 | 2.2±1.1 | - | 1±0 | 1.1±0.3 | 2.4±2.5 |
| Missing values | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | 5 |
| Traditional healer | 1.9±2.3 | 1±0 | 2.4±3.1 | 2.6±1.5 | 1.9±1.0 | 2.4±1.8 | 3.1±5.1 | 15.7±22.8 | - | 1±0 | 1.5±1.3 | 2.4±4.4 |
| Missing values | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | 0 |
| Hospital inpatient[1] | 9.1±8.1 | 6.1±8.8 | 7.6±8.5 | 12.7±9.1 | 6.0±7.1 | 6.3±8.9 | 4.6±4.4 | 30.9±28.0 | 14.0±1.4 | 9.8±7.8 | 2.3±2.5 | 9.1±13.1 |
| Missing values | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

[1] Numbers of the days in hospital

**Table 4.9. Direct medical costs at the private level in 2008 international dollars, by site**

| Type of Cost | Cuba | Dominican Republic | Peru (urban) | Peru (rural) | Venezuela | Mexico (urban) | Mexico (rural) | China (urban) | China (rural) | India (urban) | India (rural) | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Primary health centre | 0.04±1.2 | 0.1±1.8 | 5.4±79.5 | 4.5±35.0 | 3.2±79.4 | 8.2±88.6 | 5.3±30.6 | 568±3205 | 5.5±52.6 | 0.3±6.0 | 0.1±0.6 | 46±904 |
| Hospital doctor | 0.03±1.3 | 0.7±9.1 | 48±1421 | 2.7±21.8 | 0.7±12.1 | 7.6±81.8 | 2.4±23.0 | 1016±5691 | 11±135 | 0.6±10.6 | 0.6±3.8 | 85±1661 |
| Other government health worker | 0.2±5.0 | 0.8±21.8 | 2.0±26.1 | 0.1±1.9 | 30±629 | 20±283 | 17±206 | 13±423 | 0.1±3.8 | 0.1±2.4 | 0.1±1.9 | 7.8±271.8 |
| Private doctor | 0.1±4.3 | 1.4±18.3 | 22±132 | 1.2±11.8 | 87±981 | 32±127 | 65±508 | 0.2±7.4 | 7.2±227.5 | 13±149 | 15±200 | 23±393 |
| Dentist | 0.1±4.8 | 1.3±19.8 | 124±1493 | 17±372 | 59±730 | 126±1021 | 26±390 | 8.9±133.9 | - | 0.03±1.0 | 0.5±4.4 | 31±602 |
| Traditional healer | 0.2±8.2 | 0.01±0.3 | 0.5±8.9 | 0.4±4.6 | 1.2±38.8 | 5.6±91.0 | 4.9±42.1 | 1.6±43.3 | - | 0.1±1.6 | 24±638 | 2.6±167.6 |
| Admitted to hospital | 0.01±0.4 | 1.3±16.5 | 8.8±210.6 | 0 | 255±3996 | 39±1114 | 59±1057 | 329±3258 | 43±833 | 37±481 | 8.4±182.7 | 72±1773 |
| Medication | 118±324 | 13±62 | 54±295 | 8.5±58.3 | 306±1650 | 131±299 | 68±190 | 933±1657 | 115±1224 | 24±91 | 9.9±47.0 | 165±874 |
| Direct medical cost | 118±324 | 19±78 | 265±2137 | 34±379 | 744±4976 | 369±1603 | 348±3608 | 2870±8685 | 181±1613 | 75±537 | 60±1038 | 439±3369 |
| Total cost of medical care | 154±984 | 21±84 | 294±2145 | 47±386 | 768±4990 | 391±1610 | 376±3626 | 2877±8694 | 182±1613 | 81±547 | 66±1050 | 458±3400 |

**Table 4.10. Costs for medical care at the private level in 2008 international dollars, by site and gender**

| Type of Cost | Cuba | Dominican Republic | Peru (urban) | Peru (rural) | Venezuela | Mexico (urban) | Mexico (rural) | China (urban) | China (rural) | India (urban) | India (rural) | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Direct medical cost* | | | | | | | | | | | | |
| Male | 97±198 | 16±51 | 236±1918 | 49±548 | 987±7520 | 433±2290 | 291±1835 | 3117±10338 | 195±1688 | 62±440 | 96±1524 | 508±4278 |
| Female | 130±374 | 20±88 | 281±2250 | 21±84 | 621±2658 | 337±1105 | 218±819 | 2683±7192 | 170±1551 | 67±431 | 28±184 | 386±2424 |
| *Direct non-medical cost* | | | | | | | | | | | | |
| Male | 62±1556 | 1.1±5.7 | 24±85 | 12±45 | 18±105 | 20±60 | 25±85 | 5.7±22.7 | 0.1±1.7 | 5.4±21.3 | 5.3±16.3 | 20±663 |
| Female | 19±149 | 1.7±18.6 | 31±195 | 13±46 | 24±283 | 17±40 | 26±85 | 7.0±29.2 | 0.4±4.2 | 6.0±34.0 | 5.7±24.3 | 15±141 |
| *Indirect cost of carers* | | | | | | | | | | | | |
| Male | 1.2±8.5 | 0.3±2.4 | 0.5±5.0 | 0.1±1.2 | 2.1±17.5 | 3.7±23.7 | 0.8±5.9 | 0.5±5.1 | 0.1±1.3 | 0.2±1.7 | 0.3±1.2 | 0.9±9.6 |
| Female | 1.8±9.7 | 1.5±13.9 | 0.9±8.5 | 0.4±3.8 | 3.0±13.8 | 4.5±22.8 | 2.7±17.6 | 1.0±5.5 | 0.1±1.1 | 0.3±3.2 | 0.6±2.8 | 1.7±11.9 |
| *Total out of pocket cost for medical care* | | | | | | | | | | | | |
| Male | 160±1567 | 17±53 | 261±1921 | 61±555 | 1011±7537 | 456±2295 | 317±1864 | 3124±10345 | 195±1689 | 68±443 | 101±1538 | 530±4334 |
| Female | 151±410 | 24±97 | 313±2261 | 34±104 | 648±2678 | 358±1113 | 414±4422 | 2691±7203 | 171±1552 | 74±448 | 37±222 | 414±2672 |

**Table 4.11. Costs for medical care at the private level in 2008 international dollars, by site and age group**

| Type of Cost | Cuba | Dominican Republic | Peru (urban) | Peru (rural) | Venezuela | Mexico (urban) | Mexico (rural) | China (urban) | China (rural) | India (urban) | India (rural) | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Direct medical cost* | | | | | | | | | | | | |
| 65-69 | 97±125 | 16±54 | 552±3863 | 71±657 | 561±2118 | 364±1528 | 197±778 | 2495±8568 | 280±2247 | 70±497 | 39±234 | 398±2815 |
| 70-74 | 153±545 | 14±38 | 198±1069 | 26±112 | 802±3528 | 377±1276 | 214±853 | 3095±8758 | 89±462 | 61±444 | 19±82 | 462±3015 |
| 75-79 | 113±187 | 23±130 | 169±665 | 6.6±27.3 | 1329±10479 | 277±753 | 335±2180 | 2312±4374 | 181±1693 | 77±361 | 22±52 | 456±3925 |
| 80+ | 109±226 | 22±74 | 110±638 | 13±40 | 493±1876 | 450±2468 | 265±1206 | 3654±11775 | 96±488 | 122±925 | 248±2732 | 424±3474 |
| *Direct non-medical cost* | | | | | | | | | | | | |
| 65-69 | 83±1813 | 1.9±27.1 | 21±52 | 18±62 | 27±345 | 13±32 | 21±76 | 4.9±23.2 | 0.5±4.5 | 6.2±23.3 | 6.9±30.3 | 24±746 |
| 70-74 | 17±96 | 0.9±4.3 | 26±75 | 9.7±32.3 | 15±50 | 18±46 | 25±87 | 4.1±19.6 | 0.2±3.1 | 3.4±13.3 | 4.7±8.8 | 11±57 |
| 75-79 | 15±90 | 1.3±6.7 | 45±270 | 8.1±41.8 | 23±104 | 20±44 | 28±80 | 8.3±23.9 | 0 | 11±62 | 4.1±7.9 | 16±106 |
| 80+ | 20±191 | 1.8±10.5 | 24±188 | 11±30 | 15±56 | 21±65 | 29±98 | 10±40 | 0.1±1.1 | 4.8±14.9 | 6.0±26.9 | 14±119 |
| *Indirect cost of carers* | | | | | | | | | | | | |
| 65-69 | 1.9±11.3 | 0.7±3.4 | 1.2±10.6 | 0.1±1.0 | 2.7±18.0 | 2.4±12.2 | 2.9±20.5 | 0.1±1.1 | 0.03±0.4 | 0.3±2.6 | 0.3±1.6 | 1.3±11.2 |
| 70-74 | 1.7±9.7 | 1.5±18.6 | 0.7±7.5 | 0 | 2.6±12.2 | 5.0±28.3 | 1.5±9.6 | 0.8±5.5 | 0.04±0.4 | 0.1±1.1 | 0.4±1.6 | 1.5±12.4 |
| 75-79 | 1.2±5.7 | 1.2±9.8 | 0.4±2.9 | 0.1±0.7 | 2.2±13.9 | 4.9±20.4 | 1.1±9.4 | 1.2±5.5 | 0.3±2.5 | 0.1±1.6 | 0.6±2.6 | 1.3±9.1 |
| 80+ | 1.5±9.1 | 1.1±8.0 | 0.6±5.9 | 1.0±5.7 | 3.1±11.8 | 4.7±26.1 | 2.1±12.0 | 1.2±7.8 | 0.1±0.5 | 0.7±5.4 | 0.7±3.9 | 1.6±10.7 |
| *Total out of pocket cost for medical care* | | | | | | | | | | | | |
| 65-69 | 182±1816 | 19±77 | 574±3868 | 89±666 | 591±2148 | 380±1534 | 558±6212 | 2500±8574 | 280±2247 | 77±499 | 50±283 | 445±3303 |
| 70-74 | 172±560 | 17±44 | 225±1073 | 36±120 | 825±3543 | 399±1288 | 241±880 | 3100±8764 | 89±465 | 66±451 | 24±84 | 475±3020 |
| 75-79 | 130±214 | 26±131 | 214±718 | 15±56 | 1354±10498 | 302±760 | 364±2217 | 2321±4389 | 181±1693 | 88±417 | 26±57 | 473±3936 |
| 80+ | 130±304 | 25±77 | 135±667 | 25±57 | 511±1881 | 476±2472 | 296±1228 | 3666±11789 | 96±488 | 128±936 | 255±2758 | 440±3482 |

**Table 4.12. Costs for medical care at private level in 2008 international dollars, by site and dementia status**

| Type of Cost | Cuba | Dominican Republic | Peru (urban) | Peru (rural) | Venezuela | Mexico (urban) | Mexico (rural) | China (urban) | China (rural) | India (urban) | India (rural) | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Direct medical cost* | | | | | | | | | | | | |
| Dementia | 121±241 | 19±47 | 94±380 | 17±47 | 1524±10083 | 246±438 | 336±1573 | 4584±11109 | 255±706 | 82±489 | 27±63 | 535±4421 |
| Questionable and mild | 114±206 | 15±31 | 69±326 | 21±52 | 1715±11444 | 242±448 | 337±1685 | 3062±6942 | 74±117 | 91±528 | 26±63 | 433±4131 |
| Moderate and severe | 134±290 | 28±69 | 142±465 | 0 | 1039±5332 | 277±402 | 348±570 | 7324±15907 | 765±1292 | 50±112 | 70±75 | 853±5273 |
| Non-dementia | 118±332 | 19±81 | 283±2241 | 35±392 | 682±4316 | 382±1677 | 349±3745 | 2736±8458 | 177±1651 | 74±540 | 64±1099 | 430±3244 |
| *Direct non-medical cost* | | | | | | | | | | | | |
| Dementia | 18±102 | 2.1±13.5 | 14±36 | 16±31 | 27±125 | 13±25 | 27±88 | 15±51 | 1.1±5.7 | 14±76 | 6.4±11.7 | 14±73 |
| Questionable and mild | 14±87 | 2.3±15.4 | 13±37 | 20±34 | 32±143 | 13±24 | 29±93 | 13±45 | 0 | 15±82 | 5.6±9.3 | 14±72 |
| Moderate and severe | 24±122 | 1.6±6.3 | 14±33 | 3.5±5.2 | 14±57 | 12±29 | 15±32 | 18±61 | 4.3±11.1 | 12±28 | 23±27 | 15±78 |
| Non-dementia | 36±983 | 1.4±15.7 | 30±172 | 12±46 | 21±238 | 18±49 | 26±85 | 5.8±23.6 | 0.2±3.1 | 5.2±21.3 | 5.4±21.9 | 17±444 |
| *Indirect cost of carers* | | | | | | | | | | | | |
| Dementia | 1.8±8.1 | 3.3±29.1 | 1.3±8.5 | 2.6±9.9 | 1.7±8.1 | 1.8±6.6 | 1.2±6.6 | 1.1±5.0 | 0.1±0.8 | 0.2±1.0 | 0.9±4.4 | 1.7±13.7 |
| Questionable and mild | 2.1±9.4 | 4.4±34.3 | 0.8±6.6 | 3.2±11.0 | 2.0±9.2 | 1.7±6.7 | 1.4±7.1 | 0.7±3.4 | 0 | 0.2±1.1 | 1.0±4.7 | 1.9±15.8 |
| Moderate and severe | 1.2±5.4 | 0.6±2.1 | 2.2±11.2 | 0 | 1.1±4.3 | 2.7±6.0 | 0 | 1.8±7.1 | 0 | 0 | 0.7±1.2 | 1.2±5.9 |
| Non-dementia | 1.6±9.4 | 0.8±5.5 | 0.7±7.3 | 0.1±1.3 | 2.7±15.6 | 4.5±24.2 | 2.0±14.7 | 0.7±5.4 | 0.1±1.2 | 0.3±2.8 | 0.4±1.8 | 1.4±10.8 |
| *Total out of pocket cost for medical care* | | | | | | | | | | | | |
| Dementia | 141±264 | 25±62 | 109±393 | 36±74 | 1552±10108 | 260±443 | 364±1585 | 4600±11130 | 256±710 | 96±564 | 34±71 | 551±4432 |
| Questionable and mild | 130±228 | 22±57 | 83±340 | 44±80 | 1748±11470 | 256±452 | 367±1696 | 3076±6958 | 74±117 | 106±610 | 32±70 | 448±4142 |
| Moderate and severe | 159±312 | 30±70 | 159±479 | 3.5±5.2 | 1054±5359 | 292±418 | 364±598 | 7344±15936 | 770±1300 | 62±140 | 94±93 | 870±5285 |
| Non-dementia | 156±1039 | 21±87 | 313±2250 | 47±399 | 705±4330 | 405±1684 | 377±3763 | 2743±8466 | 177±1651 | 80±546 | 70±1111 | 448±3278 |

India. In urban Peru and urban Mexico, participants with dementia have less out of pocket expense than those without dementia with regard to direct medical costs and total costs, while in Venezuela and China those with dementia have higher costs.

There is a clear tendency for the direct medical costs and total cost at the private level to increase when a participant has more physical diseases. The main exception is rural Peru, where the costs are similar among different groups. The results are shown in Table 4.13.

**Public level costs of medical care**

The direct medical cost, direct non-medical cost and indirect cost have been described earlier in Table 4.5. Direct medical costs associated with specific services are shown in Table 4.14. Costs for private doctors, dentists and traditional healers are same as those at the private level as these are assumed to be equivalent to out-of-pocket expenses. Medication is not included separately in the cost of medical care at the public level. This is because prescription costs have already been accounted for in the unit costs of relevant services, including primary health centre and hospital doctor. Country differences are smaller at the public level than at the private level. Within countries, costs are generally higher in urban than that in rural sites. Hospital doctor costs are a key component of the total cost of direct medical care except for in India. Costs for other government health workers are relatively low in all centres. Costs for dentists are a large component of total medical costs in urban Peru and urban Mexico. Inpatient admissions only account for a large proportion of total medical cost in urban China. The costs for private doctors and dentists are low in Cuba, the Dominican Republic and urban China. Private doctor costs are the main cost component in rural China and India, and are an important contributor in Venezuela. Costs for traditional healers are the largest component of the total in rural India.

The gender distribution of direct medical costs, direct non-medical costs, indirect costs and total costs at the public level are shown in Table 4.15. Unlike the costs at the private level, gender differences are quite small among the whole sample. However, there are differences between the two groups among some centres. Women

have markedly lower costs in Cuba, the Dominican Republic, Peru, urban China and rural India; while men have lower costs in Venezuela.

Table 4.16 provides details of the age distribution of direct medical costs, direct non-medical costs, indirect costs and total costs. There are no major differences between the four age groups in the sample as a whole. However, younger participants have higher direct medical costs and total costs in Cuba, the Dominican Republic, urban Peru, rural Peru, rural China, while the situation is the opposite in urban China and rural India. The relationship between age and non-medical costs is limited in most of the centres except Cuba, where the youngest group has the highest direct non-medical costs. Indirect costs are similar across different age groups.

The differences in cost by dementia status are described in Table 4.17. As with the private level costs, in the whole sample participants with dementia have slightly higher costs than those with non-dementia participants and those with moderate or severe levels of dementia have higher costs than those with mild dementia. The differences between the two groups and between different severity levels of dementia are small in Cuba and the Dominican Republic. In urban Peru and urban Mexico, participants with dementia have lower direct medical and total cost for medical care than for those without dementia, while in Venezuela and China, those with dementia have higher costs.

With regard to physical diseases, the same tendency is found at the public level as with the private level. Participants with more physical diseases have higher costs for direct medical cost and total costs in all centres. The results are shown in Table 4.18.

**Table 4.13. Costs for medical care at the private level in 2008 international dollars, by site and number of physical diseases**

| Type of Cost | Cuba | Dominican Republic | Peru (urban) | Peru (rural) | Venezuela | Mexico (urban) | Mexico (rural) | China (urban) | China (rural) | India (urban) | India (rural) | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Direct medical cost* | | | | | | | | | | | | |
| 0 | 98±397 | 8.6±37.1 | 261±2344 | 42±524 | 354±1378 | 348±1908 | 170±611 | 1432±6650 | 74±989 | 46±355 | 17±79 | 216±1924 |
| 1-2 | 129±258 | 22±102 | 232±1699 | 24±101 | 583±2291 | 376±1269 | 294±1766 | 2815±8776 | 355±2231 | 81±459 | 94±1455 | 457±3088 |
| 3+ | 158±219 | 26±51 | 357±2494 | 33±58 | 1612±9390 | 414±1384 | 297±1163 | 5444±10668 | 891±3838 | 472±1832 | 32±69 | 970±5686 |
| *Direct non-medical cost* | | | | | | | | | | | | |
| 0 | 49±1391 | 0.4±2.3 | 17±55 | 6.3±25.0 | 8.5±60.8 | 14±45 | 26±104 | 1.6±9.1 | 0.02±0.5 | 4.9±31.6 | 3.6±5.9 | 16±627 |
| 1-2 | 25±181 | 2.1±22.2 | 31±164 | 16±53 | 34±378 | 19±44 | 23±68 | 6.8±26.4 | 0.8±6.1 | 7.1±25.0 | 5.7±28.2 | 17±162 |
| 3+ | 14±72 | 1.7±5.1 | 51±303 | 38±84 | 25±81 | 26±60 | 31±76 | 14±42 | 0.6±3.8 | 12±18 | 8.5±12.8 | 19±110 |
| *Indirect cost of carers* | | | | | | | | | | | | |
| 0 | 1.1±6.7 | 0.5±3.4 | 0.5±7.1 | 0.03±0.4 | 1.2±6.9 | 3.3±19.8 | 1.6±11.1 | 0.1±1.2 | 0.03±0.4 | 0.1±1.4 | 0.4±1.6 | 0.8±7.5 |
| 1-2 | 1.9±11.0 | 1.1±13.9 | 0.9±8.1 | 0.4±3.1 | 3.9±22.4 | 5.2±28.5 | 2.3±17.9 | 0.8±4.8 | 0.2±2.2 | 0.5±4.2 | 0.3±1.4 | 1.7±13.9 |
| 3+ | 2.0±9.9 | 1.7±12.1 | 1.0±6.8 | 1.4±7.6 | 3.3±11.3 | 4.8±16.2 | 1.8±9.4 | 1.9±9.4 | 0.2±0.7 | 0.7±3.1 | 1.0±4.3 | 2.2±10.5 |
| *Total out of pocket cost for medical care* | | | | | | | | | | | | |
| 0 | 148±1445 | 9.5±38.7 | 279±2349 | 48±530 | 364±1381 | 366±1913 | 198±646 | 1434±6652 | 74±989 | 51±373 | 21±81 | 233±2025 |
| 1-2 | 156±329 | 25±112 | 264±1710 | 40±120 | 625±2337 | 400±1280 | 552±5419 | 2822±8784 | 356±2233 | 90±463 | 103±1474 | 492±3375 |
| 3+ | 174±234 | 30±55 | 409±2509 | 73±119 | 1640±9406 | 444±1387 | 329±1189 | 5460±10684 | 892±3838 | 485±1844 | 42±76 | 992±5695 |

**Table 4.14. Direct medical cost at the public level in 2008 international dollars, by site (based on UK unit cost method)**

| Type of Cost | Cuba | Dominican Republic | Peru (urban) | Peru (rural) | Venezuela | Mexico (urban) | Mexico (rural) | China (urban) | China (rural) | India (urban) | India (rural) | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Primary health centre | 31±69 | 20±82 | 19±72 | 16±74 | 44±121 | 89±154 | 94±172 | 44±125 | 4.4±30.0 | 1.2±9.5 | 3.6±12.6 | 33±100 |
| Hospital doctor | 48±145 | 108±336 | 117±266 | 58±226 | 128±397 | 144±383 | 59±262 | 73±206 | 5.5±41.9 | 5.4±31.4 | 18±56 | 74±261 |
| Other government health worker | 3.7±26.2 | 0.2±6.4 | 1.3±21.3 | 0.1±2.3 | 3.1±47.6 | 4.9±47.6 | 4.1±59.7 | 0.7±22.8 | 0.2±1.3 | 0.1±1.4 | 0.6±3.3 | 2.0±30.2 |
| Hospital inpatient | 13±121 | 28±282 | 28±276 | 11±177 | 51±436 | 39±465 | 20±228 | 83±708 | 6.2±98.4 | 4.4±55.5 | 1.8±19.6 | 27±323 |
| Private doctor[2] | 0.1±4.3 | 1.4±18.3 | 22±132 | 1.2±11.8 | 87±981 | 32±127 | 64±508 | 0.2±7.4 | 7.2±227.5 | 12±149 | 15±200 | 22±393 |
| Dentist[2] | 0.1±4.8 | 1.3±19.8 | 124±1493 | 17±372 | 59±730 | 126±1021 | 26±390 | 8.9±133.9 | - | 0.03±1.0 | 0.5±4.4 | 31±602 |
| Traditional healer[2] | 0.2±8.2 | 0.01±0.3 | 0.5±8.9 | 0.4±4.6 | 1.2±38.8 | 5.6±91.0 | 4.9±42.1 | 1.6±43.3 | - | 0.1±1.6 | 24±638 | 2.6±167.6 |
| Direct medical cost | 96±212 | 159±488 | 312±1556 | 104±475 | 372±1376 | 441±1201 | 273±766 | 211±777 | 23±255 | 24±164 | 63±850 | 192±879 |
| Total cost for medical care | 134±960 | 169±502 | 354±1579 | 124±505 | 411±1415 | 478±1226 | 315±814 | 226±789 | 25±258 | 35±180 | 77±865 | 219±991 |

1 Include prescription
2 Out-of-pocket expenditures

**Table 4.15. Costs for medical care at the public level in 2008 international dollars, by site and gender (based on UK unit cost method)**

| Type of Cost | Cuba | Dominican Republic | Peru (urban) | Peru (rural) | Venezuela | Mexico (urban) | Mexico (rural) | China (urban) | China (rural) | India (urban) | India (rural) | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Direct medical cost* | | | | | | | | | | | | |
| Male | 92±204 | 178±617 | 338±1903 | 127±632 | 335±863 | 450±1240 | 267±930 | 246±936 | 28±350 | 23±88 | 95±1252 | 192±922 |
| Female | 98±216 | 150±406 | 298±1325 | 84±273 | 404±1613 | 436±1182 | 276±637 | 185±630 | 20±138 | 24±202 | 37±140 | 194±853 |
| *Direct non-medical cost* | | | | | | | | | | | | |
| Male | 62±1556 | 1.1±5.7 | 24±85 | 12±45 | 18±105 | 20±60 | 25±85 | 5.7±22.7 | 0.1±1.7 | 5.4±21.3 | 5.3±16.3 | 20±663 |
| Female | 19±149 | 1.7±18.6 | 31±195 | 13±46 | 24±283 | 17±40 | 26±85 | 7.0±29.2 | 0.4±4.2 | 6.0±34.0 | 5.7±24.3 | 15±141 |
| *Indirect cost of carers* | | | | | | | | | | | | |
| Male | 4.1±12.6 | 5.7±17.9 | 12±32 | 7.1±23.9 | 16±38 | 20±40 | 16±39 | 7.1±24.2 | 1.0±5.7 | 6.3±15.5 | 8.0±15.2 | 8.8±26.0 |
| Female | 4.2±12.0 | 8.9±22.3 | 15±40 | 8.7±30.9 | 19±38 | 20±32 | 17±36 | 9.4±24.8 | 1.2±8.7 | 5.6±14.2 | 8.3±17.5 | 10±27 |
| *Total cost for medical care* | | | | | | | | | | | | |
| Male | 158±1569 | 185±628 | 373±1918 | 146±653 | 369±898 | 490±1266 | 308±966 | 259±945 | 29±352 | 34±102 | 108±1270 | 221±1148 |
| Female | 121±303 | 160±422 | 344±1357 | 105±325 | 447±1654 | 472±1206 | 319±695 | 201±647 | 21±143 | 35±219 | 51±168 | 219±884 |

**Table 4.16. Costs for medical care at the public level in 2008 international dollars, by site and age group (based on UK unit cost method)**

| Type of Cost | Cuba | Dominican Republic | Peru (urban) | Peru (rural) | Venezuela | Mexico (urban) | Mexico (rural) | China (urban) | China (rural) | India (urban) | India (rural) | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Direct medical cost* | | | | | | | | | | | | |
| 65-69 | 92±178 | 179±684 | 477±2670 | 135±715 | 356±1402 | 448±1559 | 237±500 | 155±448 | 42±400 | 19±55 | 44±171 | 200±1093 |
| 70-74 | 99±214 | 153±362 | 330±1089 | 91±350 | 362±847 | 517±1379 | 288±739 | 231±742 | 12±61 | 30±266 | 37±85 | 194±684 |
| 75-79 | 103±236 | 158±431 | 269±807 | 69±272 | 451±2030 | 394±796 | 270±501 | 141±366 | 9.3±55.7 | 25±123 | 37±67 | 188±821 |
| 80+ | 92±219 | 148±398 | 157±352 | 102±257 | 347±1012 | 365±657 | 305±1186 | 335±1323 | 15±122 | 23±89 | 208±2244 | 186±805 |
| *Direct non-medical cost* | | | | | | | | | | | | |
| 65-69 | 83±1813 | 1.9±27.1 | 21±52 | 18±62 | 27±345 | 13±32 | 21±76 | 4.9±23.2 | 0.5±4.5 | 6.2±23.3 | 6.9±30.3 | 24±746 |
| 70-74 | 17±96 | 0.9±4.3 | 26±75 | 9.7±32.3 | 15±50 | 18±46 | 25±87 | 4.1±19.6 | 0.2±3.1 | 3.4±13.3 | 4.7±8.8 | 11±57 |
| 75-79 | 15±90 | 1.3±6.7 | 45±270 | 8.1±41.8 | 23±104 | 20±44 | 28±80 | 8.3±23.9 | 0 | 11±62 | 4.1±7.9 | 16±106 |
| 80+ | 20±191 | 1.8±10.5 | 24±188 | 11±30 | 15±56 | 21±65 | 29±98 | 10±40 | 0.1±1.1 | 4.8±14.9 | 6.0±26.9 | 14±119 |
| *Indirect cost of carers* | | | | | | | | | | | | |
| 65-69 | 4.3±13.5 | 7.1±20.9 | 13±42 | 8.0±29.0 | 14±32 | 13±25 | 15±36 | 5.1±15.9 | 0.7±5.2 | 6.1±16.4 | 7.6±14.3 | 8.6±25.2 |
| 70-74 | 4.4±12.6 | 6.5±19.2 | 16±43 | 5.8±23.6 | 20±41 | 20±40 | 16±37 | 9.1±29.4 | 1.8±11.4 | 4.8±12.2 | 8.1±16.6 | 9.9±28.3 |
| 75-79 | 3.7±10.5 | 8.0±20.1 | 15±35 | 3.5±12.5 | 20±40 | 23±36 | 17±38 | 8.4±17.2 | 1.1±6.0 | 8.1±16.9 | 8.7±17.4 | 10±26 |
| 80+ | 4.2±11.9 | 9.6±23.0 | 12±26 | 14±37 | 20±43 | 23±34 | 19±40 | 12±32 | 0.6±3.0 | 5.6±12.2 | 8.8±19.5 | 11±28 |
| *Total cost for medical care* | | | | | | | | | | | | |
| 65-69 | 179±1824 | 188±697 | 511±2684 | 161±750 | 397±1452 | 474±1578 | 273±569 | 165±466 | 43±403 | 31±78 | 58±203 | 233±1333 |
| 70-74 | 120±258 | 160±373 | 372±1113 | 106±373 | 396±874 | 556±1408 | 330±788 | 245±756 | 14±74 | 38±281 | 50±103 | 215±707 |
| 75-79 | 122±268 | 167±446 | 329±882 | 81±283 | 495±2061 | 437±827 | 315±575 | 158±382 | 10±62 | 44±158 | 50±84 | 214±849 |
| 80+ | 115±341 | 159±415 | 193±426 | 127±307 | 381±1056 | 409±688 | 353±1214 | 357±1333 | 16±123 | 33±106 | 222±2276 | 211±837 |

**Table 4.17. Costs for medical care at the public level in 2008 international dollars, by site and dementia status (based on UK unit cost method)**

| Type of Cost | Cuba | Dominican Republic | Peru (urban) | Peru (rural) | Venezuela | Mexico (urban) | Mexico (rural) | China (urban) | China (rural) | India (urban) | India (rural) | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Direct medical cost* | | | | | | | | | | | | |
| Dementia | 91±201 | 156±366 | 143±331 | 112±204 | 571±2963 | 278±452 | 459±1619 | 608±2052 | 24±75 | 35±166 | 47±109 | 216±1197 |
| Questionable and mild | 93±184 | 153±364 | 160±386 | 123±216 | 383±1074 | 253±403 | 493±1738 | 258±964 | 1.6±10.3 | 39±180 | 39±75 | 180±687 |
| Moderate and severe | 90±227 | 175±383 | 109±185 | 94±165 | 1046±5321 | 426±672 | 220±359 | 1236±3118 | 80±134 | 19±42 | 197±305 | 330±2048 |
| Non-dementia | 96±213 | 160±503 | 330±1630 | 103±489 | 356±1160 | 458±1252 | 255±627 | 180±558 | 23±261 | 23±164 | 65±900 | 190±840 |
| *Direct non-medical cost* | | | | | | | | | | | | |
| Dementia | 18±102 | 2.1±13.5 | 14±36 | 16±31 | 27±125 | 13±25 | 27±88 | 15±51 | 1.1±5.7 | 14±76 | 6.4±11.7 | 14±73 |
| Questionable and mild | 14±87 | 2.3±15.4 | 13±37 | 20±34 | 32±143 | 13±24 | 29±93 | 13±45 | 0 | 15±82 | 5.6±9.3 | 14±72 |
| Moderate and severe | 24±122 | 1.6±6.3 | 14±33 | 3.5±5.2 | 14±57 | 12±29 | 15±32 | 18±61 | 4.3±11.1 | 12±28 | 23±27 | 15±78 |
| Non-dementia | 36±983 | 1.4±15.7 | 30±172 | 12±46 | 21±238 | 18±49 | 26±85 | 5.8±23.6 | 0.2±3.1 | 5.2±21.3 | 5.4±21.9 | 17±444 |
| *Indirect cost of carers* | | | | | | | | | | | | |
| Dementia | 5.4±12.6 | 9.9±20.1 | 11±25 | 19±35 | 24±48 | 23±32 | 21±44 | 21±48 | 2.2±8.1 | 8.2±17.8 | 14±28 | 13±30 |
| Questionable and mild | 6.0±13.5 | 10±21 | 12±29 | 21±37 | 26±47 | 20±29 | 22±46 | 18±35 | 0.3±1.7 | 9.4±19.0 | 12±24 | 13±30 |
| Moderate and severe | 4.6±11.0 | 9.7±17.8 | 8.6±14.5 | 16±29 | 22±52 | 38±46 | 22±31 | 27±65 | 6.6±14.4 | 2.2±4.9 | 45±62 | 13±32 |
| Non-dementia | 4.0±12.2 | 7.5±21.1 | 14±38 | 7.2±27.1 | 17±36 | 19±35 | 16±37 | 7.4±21.6 | 1.0±7.5 | 5.7±14.5 | 7.5±14.3 | 9.5±26.4 |
| *Total cost for medical care* | | | | | | | | | | | | |
| Dementia | 114±254 | 168±385 | 167±368 | 148±256 | 622±3008 | 313±488 | 508±1641 | 643±2061 | 27±88 | 57±208 | 67±142 | 243±1219 |
| Questionable and mild | 112±236 | 165±388 | 186±429 | 164±272 | 440±1182 | 287±431 | 544±1759 | 289±989 | 1.9±12.0 | 63±224 | 57±99 | 207±724 |
| Moderate and severe | 119±282 | 187±390 | 132±208 | 113±199 | 1083±5354 | 476±738 | 257±414 | 1281±3117 | 91±158 | 33±75 | 265±390 | 358±2064 |
| Non-dementia | 136±1014 | 169±516 | 374±1654 | 122±518 | 394±1200 | 495±1277 | 297±684 | 194±573 | 24±264 | 34±177 | 78±915 | 217±966 |

**Table 4.18. Costs for medical care at the public level in 2008 international dollars, by site and number of physical diseases, by UK unit cost method**

| Type of Cost | Cuba | Dominican Republic | Peru (urban) | Peru (rural) | Venezuela | Mexico (urban) | Mexico (rural) | China (urban) | China (rural) | India (urban) | India (rural) | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Direct medical cost* | | | | | | | | | | | | |
| 0 | 70±176 | 83±314 | 237±971 | 83±580 | 232±940 | 323±905 | 264±683 | 73±298 | 16±279 | 21±196 | 22±43 | 123±581 |
| 1-2 | 113±229 | 152±409 | 325±1578 | 118±342 | 409±1663 | 513±1408 | 259±788 | 173±541 | 36±172 | 23±58 | 92±1194 | 202±943 |
| 3+ | 132±256 | 274±737 | 486±2499 | 172±293 | 559±1503 | 598±1356 | 321±875 | 554±1491 | 73±276 | 67±154 | 55±104 | 364±1274 |
| *Direct non-medical cost* | | | | | | | | | | | | |
| 0 | 49±1391 | 0.4±2.3 | 17±55 | 6.3±25.0 | 8.5±60.8 | 14±45 | 26±104 | 1.6±9.1 | 0.02±0.5 | 4.9±31.6 | 3.6±5.9 | 16±627 |
| 1-2 | 25±181 | 2.1±22.2 | 31±164 | 16±53 | 34±378 | 19±44 | 23±68 | 6.8±26.4 | 0.8±6.1 | 7.1±25.0 | 5.7±28.2 | 17±162 |
| 3+ | 14±72 | 1.7±5.1 | 51±303 | 38±84 | 25±81 | 26±60 | 31±76 | 14±42 | 0.6±3.8 | 12±18 | 8.5±12.8 | 19±110 |
| *Indirect cost of carers* | | | | | | | | | | | | |
| 0 | 3.0±9.7 | 3.3±11.0 | 8.9±31.4 | 4.2±23.7 | 11±31 | 16±27 | 15±33 | 3.3±16.3 | 0.4±2.8 | 4.2±13.3 | 6.6±10.8 | 6.3±20.9 |
| 1-2 | 5.1±14.1 | 7.4±19.2 | 15±36 | 11±32 | 18±38 | 21±39 | 16±39 | 8.7±25.3 | 2.8±13.4 | 8.6±16.9 | 6.7±14.4 | 10±27 |
| 3+ | 5.3±12.8 | 14±30 | 24±50 | 17±25 | 27±44 | 28±41 | 21±42 | 16±31 | 2.8±7.5 | 12±15 | 15±26 | 18±36 |
| *Total cost for medical care* | | | | | | | | | | | | |
| 0 | 121±1402 | 86±320 | 263±992 | 93±608 | 252±954 | 353±924 | 306±743 | 78±308 | 16±280 | 30±212 | 32±55 | 146±864 |
| 1-2 | 143±342 | 161±422 | 371±1602 | 144±374 | 461±1718 | 553±1435 | 298±823 | 188±555 | 40±182 | 39±81 | 105±1214 | 229±975 |
| 3+ | 152±283 | 290±756 | 560±2528 | 227±340 | 612±1540 | 652±1385 | 374±925 | 584±1503 | 77±278 | 91±170 | 79±131 | 401±1300 |

## 4.3. Social care

The use of social care in different countries is described in Table 4.19. Fewer than 10% of participants received any kind of social care. In the sample as a whole, participants received more help for ADLs than for other kinds of informal care, and they received more informal care than paid home care.

More participants received care for ADLs than IADLs and supervision in Cuba, the Dominican Republic, China, and rural India. In Venezuela and urban Mexico participants received less care for ADLs than for IADLs and supervision. In Peru, rural Mexico and urban India, the percentages receiving ADLs, IADLs and supervision are quite similar. No participants received paid home care in India, and very few participants received paid home care in rural Mexico and rural China. Paid home care was most frequently used in the Dominican Republic, urban Peru and urban China.

Table 4.20a shows the amount of informal care received per day among participants who received any informal care. The amounts are generally similar for different types of ADL. Participants tend to receive more help for communication and supervision than for transportation. Carers of participants from Venezuela had the lowest amount of help with ADLs among all the sites. Participants from India received the highest amounts of informal care, and this was mainly due to large amounts of supervision.

Table 4.20b shows the hours of paid home care received per week among participants who received this service. Participants tended to use relatively high amounts of paid home care, if any were received. Paid home care received during the day was usually for longer than care received during the night.

**Private social care costs**

At the private level, the costs for ADL, IADL, supervision, and paid care were added together to estimate the total cost of social care (see Table 4.2).

**Table 4.19. Number (%) of participants receiving social care, by site**

| Type of social care | Cuba (N=2944) | Dominican Republic (N=2011) | Peru (urban) (N=1381) | Peru (rural) (N=552) | Venezuela (N=1965) | Mexico (urban) (N=1003) | Mexico (rural) (N=1000) | China (urban) (N=1160) | China (rural) (N=1002) | India (urban) (N=1005) | India (rural) (N=999) | Total (N=15022) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *ADL* | | | | | | | | | | | | |
| Dressing | 168 (5.7%) | 126 (6.3%) | 91 (6.6%) | 19 (3.4%) | 29 (1.5%) | 40 (4.0%) | 39 (3.9%) | 99 (8.5%) | 28 (2.8%) | 12 (1.2%) | 65 (6.5%) | 716 (4.8%) |
| Eating | 142 (4.8%) | 124 (6.2%) | 84 (6.1%) | 18 (3.3%) | 34 (1.7%) | 39 (3.9%) | 33 (3.3%) | 111 (9.6%) | 29 (2.9%) | 16 (1.6%) | 79 (7.9%) | 709 (4.7%) |
| Grooming | 164 (5.6%) | 114 (5.7%) | 92 (6.7%) | 18 (3.3%) | 26 (1.3%) | 35 (3.5%) | 32 (3.2%) | 112 (9.7%) | 27 (2.7%) | 13 (1.3%) | 47 (4.7%) | 680 (4.5%) |
| Toileting | 141 (4.8%) | 115 (5.7%) | 100 (7.2%) | 16 (2.9%) | 38 (1.9%) | 22 (2.2%) | 28 (2.8%) | 111 (9.6%) | 25 (2.5%) | 16 (1.6%) | 56 (5.6%) | 668 (4.4%) |
| Bathing | 177 (6.0%) | 141 (7.0%) | 103 (7.5%) | 20 (3.6%) | 41 (2.1%) | 47 (4.7%) | 35 (3.5%) | 97 (8.4%) | 31 (3.1%) | 17 (1.7%) | 78 (7.8%) | 787 (5.2%) |
| Total ADL | 205 (7.0%) | 183 (9.1%) | 118 (8.5%) | 22 (4.0%) | 74 (3.8%) | 69 (6.9%) | 52 (5.2%) | 152 (13.1%) | 46 (4.6%) | 21 (2.1%) | 84 (8.4%) | 1026 (6.8%) |
| *IADL* | | | | | | | | | | | | |
| Using transport | 35 (1.2%) | 27 (1.3%) | 90 (6.5%) | 14 (2.5%) | 68 (3.5%) | 61 (6.1%) | 25 (2.5%) | 19 (1.6%) | 4 (0.4%) | 17 (1.7%) | 9 (0.9%) | 369 (2.5%) |
| Communication | 156 (5.3%) | 77 (3.8%) | 81 (5.9%) | 12 (2.2%) | 72 (3.7%) | 52 (5.2%) | 21 (2.1%) | 65 (5.6%) | 22 (2.2%) | 12 (1.2%) | 78 (7.8%) | 648 (4.3%) |
| Total IADL | 165 (5.6%) | 93 (4.6%) | 102 (7.4%) | 18 (3.3%) | 96 (4.9%) | 83 (8.3%) | 36 (3.6%) | 75 (6.5%) | 23 (2.3%) | 22 (2.2%) | 79 (7.9%) | 792 (5.3%) |
| *Supervision* | 84 (2.9%) | 39 (1.9%) | 91 (6.6%) | 14 (2.5%) | 88 (4.5%) | 48 (4.8%) | 24 (2.4%) | 16 (1.4%) | 8 (0.8%) | 17 (1.7%) | 17 (1.7%) | 446 (3.0%) |
| *Total informal care* | 225 (7.6%) | 192 (9.5%) | 128 (9.3%) | 23 (4.2%) | 136 (6.9%) | 100 (10.0%) | 64 (6.4%) | 165 (14.2%) | 49 (4.9%) | 27 (2.7%) | 85 (8.5%) | 1194 (7.9%) |
| *Paid home care* | | | | | | | | | | | | |
| During the day | 34 (1.2%) | 41 (2.0%) | 45 (3.3%) | 2 (0.4%) | 28 (1.4%) | 4 (0.4%) | 1 (0.1%) | 83 (7.2%) | 1 (0.1%) | 0 | 0 | 239 (1.6%) |
| During the night | 10 (0.3%) | 28 (1.4%) | 27 (2.0%) | 2 (0.4%) | 10 (0.5%) | 2 (0.2%) | 0 | 81 (7.0%) | 0 | 0 | 0 | 160 (1.1%) |
| Total paid home care | 35 (1.2%) | 41 (2.0%) | 45 (3.3%) | 2 (0.4%) | 29 (1.5%) | 4 (0.4%) | 1 (0.1%) | 83 (7.2%) | 1 (0.1%) | 0 | 0 | 241 (1.6%) |
| *Total social care* | 228 (7.7%) | 200 (9.9%) | 130 (9.4%) | 23 (4.2%) | 142 (7.2%) | 102 (10.2%) | 64 (6.4%) | 172 (14.8%) | 49 (4.9%) | 27 (2.7%) | 85 (8.5%) | 1222 (8.1%) |

**Table 4.20a. Hours of informal care received per day among users, by site**

| Type of informal care | Cuba | Dominican Republic | Peru (urban) | Peru (rural) | Venezuela | Mexico (urban) | Mexico (rural) | China (urban) | China (rural) | India (urban) | India (rural) | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *ADL* | | | | | | | | | | | | |
| Dressing | 1.0±1.0 | 0.7±0.8 | 0.8±0.6 | 0.9±0.7 | 0.2±0.7 | 0.5±0.7 | 0.5±0.6 | 0.9±1.0 | 0.7±0.9 | 0.8±1.1 | 0.8±0.4 | 0.7±0.8 |
| Eating | 0.9±1.0 | 0.7±0.8 | 0.7±0.6 | 0.8±0.6 | 0.3±0.8 | 0.5±0.8 | 0.6±0.8 | 1.0±0.9 | 0.9±1.0 | 1.0±1.1 | 1.0±0.3 | 0.7±0.8 |
| Grooming | 0.9±0.9 | 0.7±0.8 | 0.8±0.7 | 0.9±0.8 | 0.2±0.6 | 0.4±0.7 | 0.5±0.7 | 1.0±1.0 | 0.7±0.9 | 0.8±1.0 | 0.6±0.5 | 0.7±0.8 |
| Toileting | 0.9±1.0 | 0.7±0.8 | 0.9±0.6 | 0.7±0.7 | 0.3±0.7 | 0.3±0.6 | 0.6±0.9 | 1.1±1.1 | 0.8±1.0 | 1.1±1.1 | 0.7±0.5 | 0.7±0.9 |
| Bathing | 1.0±0.9 | 0.8±0.8 | 0.9±0.6 | 1.0±0.8 | 0.3±0.6 | 0.6±0.8 | 0.6±0.8 | 0.9±1.0 | 0.8±0.8 | 0.9±0.8 | 0.9±0.3 | 0.8±0.8 |
| Total ADL | 4.7±3.9 | 3.5±3.1 | 4.1±2.5 | 4.3±2.7 | 1.3±2.5 | 2.2±2.5 | 2.7±2.8 | 4.9±4.0 | 3.9±3.6 | 4.5±4.2 | 3.9±1.3 | 3.6±3.4 |
| *IADL* | | | | | | | | | | | | |
| Using transport | 0.2±0.6 | 0.2±0.6 | 0.8±0.6 | 0.5±0.5 | 0.6±1.0 | 1.0±1.1 | 0.6±1.0 | 0.2±0.5 | 0.1±0.4 | 1.0±0.9 | 0.1±0.3 | 0.4±0.8 |
| Communication | 2.3±3.8 | 1.0±2.6 | 1.2±2.2 | 1.8±3.3 | 1.1±2.3 | 1.3±2.7 | 0.5±1.3 | 1.4±3.2 | 1.6±3.0 | 0.7±1.0 | 1.2±0.6 | 1.4±2.8 |
| Total IADL | 2.5±3.8 | 1.2±2.6 | 2.0±2.4 | 2.3±3.3 | 1.8±2.6 | 2.3±3.1 | 1.1±1.7 | 1.5±3.2 | 1.7±3.1 | 1.8±1.5 | 1.3±0.7 | 1.8±2.9 |
| *Supervision* | 1.6±3.6 | 0.8±2.3 | 2.0±3.2 | 2.0±4.0 | 2.6±4.3 | 1.8±3.8 | 1.9±4.6 | 0.5±2.2 | 0.2±0.6 | 3.1±4.5 | 0.4±1.5 | 1.4±3.4 |
| *Total informal care* | 8.8±7.3 | 5.5±5.8 | 8.0±5.7 | 8.6±6.6 | 5.6±6.6 | 6.3±5.8 | 5.7±6.4 | 7.0±5.9 | 5.9±5.7 | 9.4±7.9 | 5.6±2.2 | 6.8±6.3 |

**Table 4.20b. Hours of paid home care received per week among users, by site**

| Type of paid care | Cuba | Dominican Republic | Peru (urban) | Peru (rural) | Venezuela | Mexico (urban) | Mexico (rural) | China (urban) | China (rural) | India (urban) | India (rural) | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| During the day | 43±15 | 46±18 | 51±11 | 56±0 | 35±19 | 44±24 | 56±0 | 54±8 | 56±0 | - | - | 48±15 |
| During the night | 16±26 | 38±26 | 34±28 | 56±0 | 19±27 | 28±32 | - | 55±9 | - | - | - | 37±26 |
| Total paid home care | 59±30 | 84±40 | 84±34 | 112±0 | 54±37 | 72±50 | 56±0 | 108±14 | 56±0 | - | - | 85±36 |

Informal care costs at the private level are shown in Table 4.21. Costs are quite similar for different ADL types. The cost of help for ADLs accounts for around half of the total cost for informal care in the whole sample, and the cost for IADLs and supervision are similar to each other. Costs vary across centres. China has the highest ADL costs, while urban India has the lowest. Venezuela has the highest cost for IADLs and supervision, while urban India has the lowest cost for supervision and rural Mexico has the lowest cost for IADLs. Cuba has the highest total informal care costs followed by urban China. Urban India has the lowest total cost.

Details of paid home care costs are shown in Table 4.22. Costs during the day are slightly higher than the costs during the night. Urban Peru and urban China have much higher costs of paid home care than the other centres. No paid care was found in India and there were very low costs for paid care in rural Mexico and rural China because very few participants used paid home care.

The gender distribution of cost for different types of social care is detailed in Table 4.23. Women have slightly higher costs for ADLs, IADLs, supervision and paid care, which lead to a larger total cost of social care in the whole sample. However, in some centres, including urban Peru and rural Mexico, men have higher costs of informal care. In rural Mexico, men have higher costs of total social care.

The age distribution of cost for different types of social care is presented in Table 4.24. The older the participant is, the higher the social care costs. This tendency can be found for each category and in most centres. Only in Peru and Venezuela for the cost of ADLs is this not the case.

The differences in cost between participants with dementia and those without are shown in Table 4.25. Dementia is a clear driver of costs of social care in every centre. Cost is also positively related to the severity of dementia. Participants with moderate/ severe dementia have higher costs than those with questionable or mild dementia.

The relationship between social care costs and the number of physical diseases is reported in Table 4.26. The number of physical diseases is modestly related to the cost of social care. However, in urban China, because of the contribution made by the cost

**Table 4.21. Cost of informal care at the private level in 2008 international dollars by site**

| Types of informal care | Cuba | Dominican Republic | Peru (urban) | Peru (rural) | Venezuela | Mexico (urban) | Mexico (rural) | China (urban) | China (rural) | India (urban) | India (rural) | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *ADL* | | | | | | | | | | | | |
| Dressing | 17±181 | 11±134 | 14±259 | 4.5±75.2 | 5.2±87.6 | 9.8±149.5 | 1.2±36.9 | 25±262 | 4.9±61.2 | 0 | 4.4±28.9 | 10±153 |
| Eating | 16±167 | 13±148 | 12±254 | 3.6±45.8 | 9.3±125.8 | 12±147 | 1.2±36.9 | 23±226 | 5.8±73.3 | 1.1±33.7 | 7.3±46.7 | 11±150 |
| Grooming | 17±169 | 8.9±100.8 | 15±258 | 5.4±75.4 | 6.2±104.7 | 14±166 | 2.4±52.9 | 22±211 | 4.0±52.4 | 0.4±11.2 | 2.9±24.3 | 10±143 |
| Toileting | 12±132 | 9.5±111.5 | 14±257 | 2.7±40.6 | 4.7±78.6 | 10±138 | 2.5±47.6 | 23±230 | 5.0±59.6 | 0.7±22.5 | 5.2±35.4 | 9.0±133.9 |
| Bathing | 20±202 | 12±125 | 15±260 | 6.0±84.8 | 5.4±90.3 | 14±149 | 2.5±47.6 | 21±247 | 5.2±50.9 | 0.4±11.2 | 6.3±41.4 | 11±156 |
| Total ADL | 82±763 | 54±561 | 70±1282 | 22±302 | 31±406 | 60±610 | 9.6±197.5 | 114±1071 | 25±266 | 2.5±78.6 | 26±154 | 52±675 |
| *IADL* | | | | | | | | | | | | |
| Using transport | 5.3±81.3 | 2.8±74.1 | 13±183 | 1.5±25.5 | 16±163 | 16±241 | 1.2±36.9 | 0.9±22.5 | 0 | 1.2±28.1 | 0.5±9.5 | 6.0±112.7 |
| Communication | 36±477 | 12±154 | 18±377 | 7.2±112.7 | 27±333 | 30±510 | 0.8±26.3 | 25±424 | 16±218 | 0.9±20.2 | 8.3±53.6 | 20±332 |
| Total IADL | 42±491 | 15±196 | 31±526 | 8.7±121.0 | 43±402 | 46±639 | 2.0±45.3 | 26±426 | 16±218 | 2.1±47.6 | 8.8±56.1 | 26±380 |
| *Supervision* | 38±943 | 8.1±141.0 | 31±526 | 16±220 | 55±590 | 26±388 | 5.6±153.9 | 8.3±281.3 | 2.1±40.2 | 0.6±14.0 | 2.7±49.2 | 22±518 |
| *Total informal care* | 161±1692 | 77±720 | 131±2203 | 47±619 | 129±1132 | 132±1198 | 17±311 | 148±1498 | 43±431 | 5.2±130.4 | 38±226 | 100±1246 |

**Table 4.22. Cost of paid home care at the private level in 2008 international dollars, by site**

| Paid home care | Cuba | Dominican Republic | Peru (urban) | Peru (rural) | Venezuela | Mexico (urban) | Mexico (rural) | China (urban) | China (rural) | India (urban) | India (rural) | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| During the day | 25±245 | 65±483 | 181±1010 | 22±369 | 66±617 | 9.3±163.0 | 3.0±94.0 | 229±836 | 3.3±105.6 | - | - | 58±504 |
| During the night | 9.5±162.3 | 54±455 | 120±849 | 22±369 | 36±511 | 5.9±132.7 | - | 233±852 | - | - | - | 44±447 |
| Total paid home care | 35±356 | 119±913 | 301±1767 | 44±738 | 103±1009 | 15±282 | 3.0±94.0 | 463±1683 | 3.3±105.6 | - | - | 103±905 |

**Table 4.23. Cost of social care at the private level in 2008 international dollars, by site and gender**

| Types of informal care | Cuba | Dominican Republic | Peru (urban) | Peru (rural) | Venezuela | Mexico (urban) | Mexico (rural) | China (urban) | China (rural) | India (urban) | India (rural) | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *ADL costs* | | | | | | | | | | | | |
| Male | 66±715 | 30±352 | 116±2039 | 14±218 | 16±177 | 41±434 | 20±302 | 111±1091 | 18±176 | 0 | 20±130 | 44±772 |
| Female | 90±788 | 66±643 | 44±498 | 30±360 | 20±291 | 70±681 | 2.8±67.9 | 115±1056 | 30±320 | 4.4±104.3 | 31±172 | 53±591 |
| *IADL costs* | | | | | | | | | | | | |
| Male | 30±361 | 7.8±108.9 | 55±838 | 3.9±62.2 | 22±260 | 16±166 | 2.9±58.4 | 12±148 | 23±290 | 2.5±52.2 | 6.5±43.2 | 19±323 |
| Female | 48±548 | 18±229 | 18±201 | 13±155 | 40±389 | 61±775 | 1.4±33.9 | 37±549 | 10±134 | 1.9±44.7 | 11±65 | 28±401 |
| *Supervision costs* | | | | | | | | | | | | |
| Male | 12±211 | 4.0±72.8 | 44±666 | 5.8±93.4 | 24±336 | 7.4±101.3 | 12±240 | 0 | 3.1±50.8 | 0.6±13.0 | 1.6±23.6 | 11±257 |
| Female | 52±1160 | 10±166 | 23±431 | 25±288 | 56±626 | 35±471 | 1.4±33.9 | 14±373 | 1.2±29.0 | 0.6±14.9 | 3.7±63.1 | 27±617 |
| *Informal care costs* | | | | | | | | | | | | |
| Male | 107±1075 | 42±470 | 215±3484 | 23±374 | 62±670 | 65±655 | 35±463 | 123±1116 | 44±459 | 3.2±65.2 | 29±185 | 74±1229 |
| Female | 190±1945 | 95±819 | 85±902 | 68±772 | 116±1086 | 166±1394 | 5.5±135.7 | 167±1733 | 42±408 | 6.9±163.8 | 45±254 | 109±1227 |
| *Paid home care costs* | | | | | | | | | | | | |
| Male | 26±301 | 64±678 | 201±1386 | 0 | 86±964 | 8.8±162.0 | 0 | 335±1460 | 0 | 0 | 0 | 70±740 |
| Female | 39±382 | 148±1013 | 356±1945 | 83±1008 | 73±803 | 18±326 | 4.9±121.2 | 559±1828 | 6.0±141.8 | 0 | 0 | 118±965 |
| *Total costs of social care* | | | | | | | | | | | | |
| Male | 133±1221 | 106±838 | 416±4041 | 23±374 | 147±1405 | 74±674 | 35±463 | 458±2097 | 44±459 | 3.2±65.2 | 29±185 | 144±1571 |
| Female | 230±2074 | 243±1474 | 441±2390 | 151±1340 | 189±1433 | 184±1434 | 10±182 | 726±2670 | 48±431 | 6.9±163.8 | 45±254 | 226±1669 |

**Table 4.24. Cost of social care at the private level in 2008 international dollars, by site and age group**

| Types of informal care | Cuba | Dominican Republic | Peru (urban) | Peru (rural) | Venezuela | Mexico (urban) | Mexico (rural) | China (urban) | China (rural) | India (urban) | India (rural) | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *ADL costs* | | | | | | | | | | | | |
| 65-69 | 13±211 | 16±328 | 22±299 | 0 | 14±292 | 8.2±84.5 | 5.6±96.3 | 16±202 | 8.9±125.9 | 0 | 15±108 | 12±219 |
| 70-74 | 64±635 | 7.1±110.3 | 128±2393 | 25±294 | 41±520 | 34±470 | 0 | 70±1032 | 25±270 | 7.8±139.7 | 26±150 | 42±843 |
| 75-79 | 82±693 | 36±412 | 49±574 | 16±166 | 74±590 | 144±1055 | 0 | 106±856 | 40±412 | 0 | 22±140 | 59±593 |
| 80+ | 170±1182 | 146±941 | 80±591 | 55±521 | 14±122 | 58±463 | 35±398 | 326±1795 | 49±271 | 0 | 59±246 | 113±899 |
| *IADL costs* | | | | | | | | | | | | |
| 65-69 | 18±315 | 2.8±48.3 | 21±251 | 0 | 6.4±134.4 | 4.9±54.1 | 2.8±48.2 | 1.1±19.1 | 15±280 | 0 | 6.0±44.7 | 8.2±177.7 |
| 70-74 | 29±331 | 1.9±38.0 | 52±957 | 7.1±84.0 | 33±304 | 46±512 | 0 | 0 | 4.9±64.2 | 3.4±59.9 | 8.4±54.9 | 19±361 |
| 75-79 | 40±325 | 4.8±48.6 | 18±224 | 6.6±66.2 | 88±488 | 4.1±58.2 | 0 | 2.3±36.5 | 25±203 | 0 | 6.7±40.0 | 24±244 |
| 80+ | 81±800 | 45±363 | 32±243 | 24±225 | 105±753 | 110±1161 | 5.1±77.2 | 129±953 | 30±256 | 8.6±95.9 | 19±90 | 62±635 |
| *Supervision costs* | | | | | | | | | | | | |
| 65-69 | 15±277 | 0 | 4.6±63.1 | 0 | 21±352 | 0 | 2.8±48.2 | 0 | 1.8±35.0 | 0 | 1.4±25.4 | 7.0±188.0 |
| 70-74 | 15±238 | 0.8±18.7 | 39±718 | 11±126 | 53±650 | 38±515 | 0 | 0 | 0 | 1.1±20.0 | 5.0±77.4 | 16±352 |
| 75-79 | 14±244 | 0 | 11±124 | 36±364 | 80±683 | 4.1±58.2 | 0 | 0 | 5.1±72.2 | 0 | 0 | 15±272 |
| 80+ | 106±1818 | 28±265 | 66±741 | 28±292 | 124±845 | 55±533 | 21±318 | 42±634 | 3.1±28.6 | 2.2±24.0 | 3.8±27.9 | 60±992 |
| *Informal care costs* | | | | | | | | | | | | |
| 65-69 | 46±554 | 19±337 | 48±545 | 0 | 42±597 | 13±138 | 11±193 | 17±215 | 26±403 | 0 | 22±166 | 27±415 |
| 70-74 | 107±992 | 9.9±124.6 | 220±4069 | 42±504 | 127±1257 | 118±1128 | 0 | 70±1032 | 30±317 | 12±220 | 39±240 | 77±1406 |
| 75-79 | 137±1057 | 41±427 | 78±920 | 59±596 | 243±1458 | 152±1110 | 0 | 109±866 | 70±589 | 0 | 28±177 | 99±885 |
| 80+ | 358±2986 | 220±1256 | 178±1212 | 107±1036 | 243±1546 | 222±1744 | 61±612 | 498±2952 | 83±446 | 11±120 | 81±335 | 234±1928 |
| *Paid home care costs* | | | | | | | | | | | | |
| 65-69 | 12±218 | 0 | 82±835 | 0 | 50±705 | 0 | 9.9±172.0 | 148±986 | 0 | 0 | 0 | 28±471 |
| 70-74 | 20±245 | 30±481 | 142±1162 | 0 | 76±992 | 0 | 0 | 185±1097 | 0 | 0 | 0 | 44±609 |
| 75-79 | 16±254 | 148±1008 | 188±1402 | 121±1220 | 187±1257 | 31±416 | 0 | 397±1550 | 17±235 | 0 | 0 | 105±900 |
| 80+ | 90±572 | 294±1417 | 785±2851 | 94±1072 | 193±1366 | 40±444 | 0 | 1414±2710 | 0 | 0 | 0 | 289±1503 |
| *Total costs for social care* | | | | | | | | | | | | |
| 65-69 | 58±680 | 19±337 | 129±1057 | 0 | 92±1054 | 13±138 | 21±258 | 165±1115 | 26±403 | 0 | 22±166 | 55±695 |
| 70-74 | 127±1112 | 40±496 | 362±4529 | 42±504 | 204±1866 | 118±1128 | 0 | 254±1782 | 30±317 | 12±220 | 39±240 | 122±1670 |
| 75-79 | 152±1145 | 189±1139 | 266±2059 | 181±1353 | 430±2163 | 183±1199 | 0 | 506±1865 | 87±632 | 0 | 28±177 | 203±1386 |
| 80+ | 448±3174 | 514±2145 | 962±3395 | 200±1625 | 436±2106 | 262±1795 | 61±612 | 1912±4198 | 83±446 | 11±120 | 81±335 | 523±2600 |

**Table 4.25. Cost of social care at the private level in 2008 international dollars, by site and dementia status**

| Types of informal care | Cuba | Dominican Republic | Peru (urban) | Peru (rural) | Venezuela | Mexico (urban) | Mexico (rural) | China (urban) | China (rural) | India (urban) | India (rural) | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *ADL costs* | | | | | | | | | | | | |
| Dementia | 627±2110 | 293±1390 | 504±4031 | 296±1130 | 278±1375 | 509±1832 | 44±239 | 713±2869 | 334±1010 | 33±288 | 85±256 | 385±1988 |
| Questionable and mild | 291±1337 | 137±703 | 11±101 | 321±1240 | 212±1216 | 479±1886 | 51±257 | 228±1011 | 101±543 | 39±311 | 61±208 | 180±1004 |
| Moderate and severe | 1164±2877 | 736±2401 | 1435±6802 | 266±595 | 445±1720 | 714±1620 | 0 | 1586±4524 | 1019±1656 | 0 | 496±528 | 984±3458 |
| Non-dementia | 14±256 | 21±293 | 25±340 | 3.2±73.2 | 11±151 | 14±217 | 6.4±192.9 | 67±755 | 6.5±97.3 | 0 | 19±136 | 18±300 |
| *IADL costs* | | | | | | | | | | | | |
| Dementia | 314±1353 | 100±529 | 207±1621 | 116±453 | 217±881 | 264±1739 | 9.6±89.3 | 236±1448 | 159±756 | 28±173 | 28±86 | 179±1084 |
| Questionable and mild | 132±719 | 56±464 | 0 | 120±493 | 192±870 | 275±1880 | 11±96 | 32±233 | 26±162 | 33±187 | 21±73 | 89±716 |
| Moderate and severe | 604±1951 | 225±678 | 597±2732 | 133±298 | 279±917 | 216±672 | 0 | 604±2384 | 562±1451 | 0 | 142±175 | 444±1735 |
| Non-dementia | 8.3±188.5 | 3.2±66.6 | 13±175 | 1.3±29.3 | 29±332 | 24±373 | 1.3±38.6 | 9.8±172.1 | 7.5±125.1 | 0 | 6.5±51.0 | 10±195 |
| *Supervision costs* | | | | | | | | | | | | |
| Dementia | 284±2761 | 63±399 | 134±1193 | 143±602 | 308±1346 | 108±527 | 65±521 | 114±1045 | 19±100 | 8.3±51.0 | 23±148 | 148±1502 |
| Questionable and mild | 32±263 | 26±218 | 0 | 166±668 | 238±1242 | 53±266 | 75±561 | 0 | 0 | 9.7±55.2 | 2.8±27.4 | 51±478 |
| Moderate and severe | 684±4408 | 167±681 | 386±2018 | 66±149 | 487±1582 | 424±1191 | 0 | 319±1749 | 76±194 | 0 | 320±517 | 426±2823 |
| Non-dementia | 7.5±231.3 | 0.7±20.6 | 20±397 | 7.1±161.1 | 35±477 | 17±371 | 0 | 0 | 1.1±33.4 | 0 | 0.2±6.1 | 9.5±255.9 |
| *Informal care costs* | | | | | | | | | | | | |
| Dementia | 1225±4791 | 456±1834 | 844±6840 | 554±2176 | 803±2984 | 881±2937 | 118±737 | 1063±4674 | 512±1539 | 70±476 | 136±436 | 712±3686 |
| Questionable and mild | 455±1850 | 219±1045 | 11±101 | 608±2395 | 642±2898 | 807±2916 | 137±793 | 259±1031 | 127±704 | 82±514 | 85±296 | 320±1662 |
| Moderate and severe | 2452±7194 | 1128±3040 | 2418±11545 | 466±1041 | 1212±3194 | 1354±3220 | 0 | 2509±7564 | 1657±2578 | 0 | 958±1077 | 1854±6558 |
| Non-dementia | 30±490 | 25±328 | 57±688 | 12±264 | 75±800 | 55±804 | 7.7±231.5 | 77±815 | 15±212 | 0 | 26±181 | 38±544 |
| *Paid home care costs* | | | | | | | | | | | | |
| Dementia | 236±871 | 618±2042 | 2190±4448 | 341±2044 | 565±2164 | 68±618 | 34±319 | 2934±3276 | 0 | 0 | 0 | 624±2177 |
| Questionable and mild | 79±454 | 268±1338 | 1608±3892 | 0 | 207±1072 | 5.4±48.1 | 0 | 2140±3092 | 0 | 0 | 0 | 338±1624 |
| Moderate and severe | 484±1243 | 1611±3109 | 3290±5216 | 2453±5485 | 1475±3565 | 425±1590 | 372±1051 | 4362±3157 | 0 | 0 | 0 | 1464±3160 |
| Non-dementia | 10±208 | 51±584 | 104±998 | 24±540 | 66±843 | 9.8±220.3 | 0 | 270±1308 | 3.5±108.7 | 0 | 0 | 50±627 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Total costs for social care* | | | | | | | | | | | | |
| Dementia | 1461±5032 | 1074±2997 | 3034±8636 | 895±3187 | 1368±3986 | 949±2996 | 152±798 | 3997±5848 | 512±1539 | 70±476 | 136±436 | 1336±4501 |
| Questionable and mild | 534±1990 | 487±1676 | 1619±3923 | 608±2395 | 849±3156 | 812±2933 | 137±793 | 2400±3425 | 127±704 | 82±514 | 85±296 | 658±2343 |
| Moderate and severe | 2937±7479 | 2740±4776 | 5708±13346 | 2918±6526 | 2687±5391 | 1778±3414 | 372±1051 | 6872±7947 | 1657±2578 | 0 | 958±1077 | 3318±7588 |
| Non-dementia | 40±627 | 76±747 | 162±1416 | 35±600 | 141±1302 | 65±833 | 7.7±231.5 | 346±1681 | 19±238 | 0 | 26±181 | 88±926 |

**Table 4.26. Cost of social care at the private level in 2008 international dollars, by site and number of physical diseases**

| Types of informal care | Cuba | Dominican Republic | Peru (urban) | Peru (rural) | Venezuela | Mexico (urban) | Mexico (rural) | China (urban) | China (rural) | India (urban) | India (rural) | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *ADL costs* | | | | | | | | | | | | |
| 0 | 55±605 | 16±220 | 36±450 | 5.9±99.4 | 14±149 | 10±166 | 3.1±61.3 | 18±266 | 6.0±95.7 | 0 | 20±134 | 21±330 |
| 1-2 | 84±791 | 46±390 | 115±1958 | 31±392 | 20±303 | 84±744 | 16±284 | 145±1321 | 29±254 | 7.9±140.1 | 22±133 | 62±849 |
| 3+ | 188±1157 | 119±993 | 52±438 | 87±552 | 23±307 | 143±948 | 9.0±122.4 | 184±1096 | 332±1067 | 0 | 52±231 | 96±780 |
| *IADL costs* | | | | | | | | | | | | |
| 0 | 28±338 | 3.4±46.7 | 13±177 | 2.4±39.8 | 36±296 | 20±307 | 0 | 19±272 | 3.5±67.9 | 1.7±42.0 | 7.4±53.4 | 15±220 |
| 1-2 | 35±351 | 20±254 | 45±783 | 14±170 | 19±248 | 73±906 | 2.7±56.0 | 27±512 | 26±222 | 3.4±60.1 | 7.7±51.4 | 26±420 |
| 3+ | 132±1161 | 19±179 | 44±344 | 25±158 | 49±505 | 53±540 | 4.5±61.2 | 38±355 | 168±890 | 0 | 15±72 | 47±537 |
| *Supervision costs* | | | | | | | | | | | | |
| 0 | 46±1353 | 0 | 7.2±95.3 | 13±219 | 11±151 | 24±430 | 13±245 | 0 | 2.5±46.8 | 0.4±10.5 | 5.2±80.2 | 15±627 |
| 1-2 | 29±407 | 15±200 | 64±826 | 16±220 | 40±538 | 16±225 | 0 | 0 | 1.4±19.3 | 1.1±20.0 | 0.4±8.2 | 20±372 |
| 3+ | 43±354 | 4.9±69.2 | 11±89 | 37±237 | 102±834 | 55±552 | 4.5±61.2 | 46±664 | 0 | 0 | 4.9±41.6 | 38±477 |
| *Informal care costs* | | | | | | | | | | | | |
| 0 | 130±1914 | 20±259 | 56±721 | 21±358 | 61±470 | 55±792 | 16±307 | 36±526 | 12±205 | 2.1±52.5 | 32±227 | 52±950 |
| 1-2 | 149±1243 | 81±702 | 225±3374 | 60±780 | 79±1008 | 172±1342 | 18±339 | 171±1691 | 56±409 | 12±220 | 30±182 | 108±1394 |
| 3+ | 364±2346 | 143±1070 | 108±788 | 150±947 | 175±1348 | 251±1683 | 18±245 | 268±1938 | 500±1650 | 0 | 71±319 | 181±1408 |
| *Paid home care costs* | | | | | | | | | | | | |
| 0 | 11±161 | 46±571 | 255±1629 | 0 | 44±621 | 0 | 7.8±152.1 | 202±1129 | 0 | 0 | 0 | 48±641 |
| 1-2 | 40±383 | 99±826 | 345±1908 | 53±807 | 77±887 | 31±425 | 0 | 422±1614 | 12±204 | 0 | 0 | 107±918 |
| 3+ | 112±687 | 254±1334 | 317±1777 | 307±1939 | 130±1117 | 19±237 | 0 | 1017±2389 | 0 | 0 | 0 | 222±1280 |
| *Total costs for social care* | | | | | | | | | | | | |
| 0 | 141±1928 | 66±768 | 312±1974 | 21±358 | 105±976 | 55±792 | 24±342 | 239±1239 | 12±205 | 2.1±52.5 | 32±227 | 99±1202 |
| 1-2 | 189±1388 | 180±1134 | 569±4189 | 114±1226 | 155±1504 | 204±1412 | 18±339 | 594±2654 | 69±455 | 12±220 | 30±182 | 216±1815 |
| 3+ | 476±2834 | 397±1953 | 425±2226 | 456±2136 | 305±1820 | 270±1696 | 18±245 | 1285±3108 | 500±1650 | 0 | 71±319 | 403±2062 |

of paid home care, cost is related to the number of physical diseases. Participants have higher costs among those with three or more physical diseases in urban China.

**Public social care costs**

At the public level, the total cost of social care is also divided into costs for ADL, IADL, supervision and paid care. However, the cost for paid care is the same as at the private level. These results have been reported in Table 4.2. This is because the 10/66 survey did not collect information on the expenditure for paid home care by families. The unit cost of paid home care was defined and calculated in the same way as for the private and public level cost estimates.

Detailed costs of informal care at the public level are presented in Table 4.27. Costs for help with ADLs make up around one-half of the total cost for social care and IADLs and supervision each make up around one-quarter. Costs do vary across centres. China still has the highest cost for ADLs at the public level, while urban India has the lowest cost. Urban Mexico has the highest cost for IADL and Venezuela has the highest cost for supervision. Urban India has the lowest cost for IADLs and rural China has the lowest cost for supervision.

The gender distribution of cost for different types of social care at the public level is shown in Table 4.28. The gender difference at this level is similar to that at the private level. Women have higher costs for help with ADLs, IADLs, supervision and paid care. In urban Peru and rural Mexico men have higher costs for informal care than women and in rural Mexico and rural China men have higher total social care costs.

The age distribution of cost for different types of social care is reported in Table 4.29. It is clear that older participants have higher cost for every type of social care. This finding is consistent with the costs at the private level.

The difference in cost between participants with dementia and those without, and the distribution of cost among those with different numbers of physical diseases are described in Tables 4.30 and 4.31 respectively. Similar to the findings at the private level, dementia is a clear driver of the cost of social care, while the impact of physical diseases is much weaker. Costs for paid home care do though appear to be associated with the number of physical diseases.

**Table 4.27. Cost of informal care at the public level in 2008 international dollars using the ILO average wage method, by site**

| Types of informal care | Cuba | Dominican Republic | Peru (urban) | Peru (rural) | Venezuela | Mexico (urban) | Mexico (rural) | China (urban) | China (rural) | India (urban) | India (rural) | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *ADL* | | | | | | | | | | | | |
| Dressing | 63±286 | 104±453 | 154±615 | 84±489 | 38±354 | 91±486 | 72±370 | 210±751 | 58±374 | 27±267 | 78±294 | 87±440 |
| Eating | 54±265 | 103±446 | 140±579 | 74±417 | 48±402 | 96±517 | 82±491 | 223±745 | 68±428 | 34±292 | 99±346 | 89±451 |
| Grooming | 57±262 | 98±445 | 156±627 | 84±519 | 34±326 | 79±440 | 67±405 | 229±768 | 57±372 | 27±262 | 56±252 | 83±436 |
| Toileting | 57±282 | 98±441 | 169±635 | 66±418 | 47±378 | 53±392 | 79±515 | 259±862 | 62±424 | 37±310 | 67±274 | 88±465 |
| Bathing | 62±270 | 114±454 | 185±696 | 99±558 | 42±314 | 113±547 | 82±467 | 210±756 | 62±382 | 30±239 | 94±326 | 95±461 |
| Total ADL | 293±1245 | 517±1946 | 803±2897 | 408±2170 | 209±1396 | 432±1893 | 383±1893 | 1132±3468 | 308±1762 | 155±1230 | 393±1364 | 442±1978 |
| *IADL* | | | | | | | | | | | | |
| Using transport | 12±123 | 29±278 | 150±594 | 51±319 | 103±589 | 197±833 | 82±559 | 36±309 | 8.7±145.0 | 36±279 | 11±113 | 61±424 |
| Communication | 146±916 | 149±1167 | 242±1563 | 168±1611 | 186±1277 | 247±1702 | 75±704 | 310±1956 | 125±1139 | 25±251 | 117±430 | 164±1228 |
| Total IADL | 158±940 | 178±1218 | 392±1924 | 219±1729 | 289±1564 | 444±2153 | 157±995 | 347±2020 | 133±1167 | 60±458 | 128±476 | 225±1401 |
| *Supervision* | 101±829 | 113±1033 | 388±2317 | 192±1918 | 422±2487 | 349±2404 | 266±2417 | 120±1286 | 19±229 | 108±1087 | 44±522 | 194±1654 |
| *Total informal care* | 552±2338 | 808±3320 | 1583±6010 | 819±4669 | 920±4243 | 1224±4797 | 806±4145 | 1600±5040 | 460±2714 | 324±2453 | 565±2006 | 861±3869 |

**Table 4.28. Cost of social care at the public level in 2008 international dollars in 2008 using the ILO average wage method, by site and gender**

| Types of informal care | Cuba | Dominican Republic | Peru (urban) | Peru (rural) | Venezuela | Mexico (urban) | Mexico (rural) | China (urban) | China (rural) | India (urban) | India (rural) | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *ADL costs* | | | | | | | | | | | | |
| Male | 208±1069 | 370±1591 | 740±2758 | 426±2305 | 135±990 | 479±2027 | 345±1804 | 1031±3417 | 339±1866 | 151±1112 | 304±1224 | 385±1884 |
| Female | 339±1328 | 594±2103 | 838±2972 | 392±2049 | 146±1060 | 408±1822 | 408±1951 | 1209±3507 | 282±1675 | 163±1326 | 468±1467 | 464±1994 |
| *IADL costs* | | | | | | | | | | | | |
| Male | 154±1055 | 196±1519 | 378±2066 | 316±2370 | 138±922 | 442±2247 | 187±1203 | 178±1311 | 202±1606 | 68±461 | 97±403 | 198±1409 |
| Female | 160±872 | 170±1030 | 400±1840 | 136±833 | 286±1590 | 445±2105 | 137±830 | 475±2414 | 78±618 | 56±462 | 153±528 | 230±1356 |
| *Supervision costs* | | | | | | | | | | | | |
| Male | 74±767 | 90±885 | 362±2317 | 71±486 | 251±1813 | 282±2288 | 404±3174 | 82±894 | 20±238 | 108±1016 | 29±255 | 153±1501 |
| Female | 115±861 | 125±1102 | 402±2318 | 298±2581 | 377±2309 | 383±2462 | 174±1743 | 150±1517 | 18±222 | 110±1150 | 57±667 | 201±1639 |
| *Informal care costs* | | | | | | | | | | | | |
| Male | 436±2218 | 656±3152 | 1481±5956 | 813±4506 | 524±3043 | 1203±5035 | 937±4779 | 1290±4214 | 560±3299 | 327±2326 | 430±1734 | 736±3661 |
| Female | 615±2398 | 888±3404 | 1640±6043 | 825±4815 | 809±3861 | 1236±4676 | 719±3668 | 1834±5575 | 379±2131 | 330±2574 | 677±2202 | 895±3857 |
| *Paid home care costs* | | | | | | | | | | | | |
| Male | 26±301 | 64±678 | 201±1386 | 0 | 86±964 | 8.8±162.0 | 0 | 335±1460 | 0 | 0 | 0 | 70±740 |
| Female | 39±382 | 148±1013 | 356±1945 | 83±1008 | 73±803 | 18±326 | 4.9±121.2 | 559±1828 | 6.0±141.8 | 0 | 0 | 118±965 |
| *Total costs of social care* | | | | | | | | | | | | |
| Male | 462±2362 | 720±3394 | 1682±6531 | 813±4506 | 610±3435 | 1212±5081 | 937±4779 | 1625±5115 | 560±3299 | 327±2326 | 430±1734 | 806±3932 |
| Female | 654±2526 | 1036±3794 | 1996±7181 | 908±5125 | 882±4061 | 1254±4684 | 724±3688 | 2393±6842 | 385±2138 | 330±2574 | 677±2202 | 1013±4295 |

**Table 4.29. Cost of social care at the public level in 2008 international dollars in 2008 using the ILO average wage method, by site and age**

| Types of informal care | Cuba | Dominican Republic | Peru (urban) | Peru (rural) | Venezuela | Mexico (urban) | Mexico (rural) | China (urban) | China (rural) | India (urban) | India (rural) | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *ADL costs* | | | | | | | | | | | | |
| 65-69 | 59±486 | 131±1022 | 227±1595 | 113±1069 | 64±897 | 112±686 | 207±1495 | 474±2168 | 110±977 | 63±760 | 259±1117 | 143±1123 |
| 70-74 | 136±817 | 249±1174 | 438±2280 | 331±2094 | 112±976 | 318±1680 | 239±1423 | 731±3117 | 339±1924 | 232±1657 | 361±1328 | 292±1678 |
| 75-79 | 166±893 | 386±1659 | 640±2579 | 562±2297 | 277±1681 | 394±1841 | 451±2068 | 1024±3163 | 475±2284 | 108±689 | 269±1096 | 403±1898 |
| 80+ | 802±2024 | 1226±2940 | 1857±4075 | 774±3055 | 661±2304 | 932±2717 | 708±2506 | 2804±4960 | 576±2184 | 326±1645 | 946±2010 | 1106±2968 |
| *IADL costs* | | | | | | | | | | | | |
| 65-69 | 50±598 | 105±1188 | 108±763 | 147±1824 | 86±1079 | 196±1511 | 80±592 | 83±937 | 72±1199 | 12±165 | 90±399 | 84±967 |
| 70-74 | 71±599 | 70±493 | 219±1620 | 115±718 | 162±1005 | 298±1533 | 164±931 | 221±1496 | 98±823 | 79±589 | 129±517 | 139±990 |
| 75-79 | 91±683 | 144±934 | 361±1896 | 336±2119 | 340±1416 | 184±944 | 143±794 | 395±2492 | 216±1426 | 91±528 | 88±360 | 207±1327 |
| 80+ | 415±1498 | 373±1757 | 868±2771 | 341±2015 | 980±2840 | 1118±3590 | 264±1520 | 860±2955 | 276±1290 | 144±618 | 262±622 | 558±2182 |
| *Supervision costs* | | | | | | | | | | | | |
| 65-69 | 29±324 | 42±653 | 38±312 | 11±152 | 149±1669 | 119±1425 | 241±2363 | 41±659 | 7.6±148.5 | 109±1312 | 14±160 | 76±1107 |
| 70-74 | 81±791 | 93±1026 | 196±1487 | 158±1164 | 216±1660 | 157±1263 | 95±1307 | 40±629 | 0 | 112±915 | 54±568 | 108±1070 |
| 75-79 | 57±719 | 72±957 | 354±2115 | 608±4119 | 710±3326 | 151±802 | 222±1803 | 86±818 | 36±338 | 108±1099 | 6.7±89.5 | 202±1726 |
| 80+ | 221±1176 | 227±1334 | 966±3787 | 155±928 | 1153±3801 | 1070±4499 | 527±3639 | 396±2525 | 72±413 | 96±539 | 135±1027 | 473±2591 |
| *Informal care costs* | | | | | | | | | | | | |
| 65-69 | 138±1058 | 278±2418 | 373±2591 | 272±2871 | 300±2806 | 428±2588 | 528±3770 | 598±2925 | 190±1952 | 184±2144 | 363±1562 | 302±2419 |
| 70-74 | 289±1672 | 412±2215 | 853±4651 | 604±3808 | 490±2858 | 773±3323 | 498±2810 | 992±4109 | 437±2569 | 423±2951 | 544±2064 | 538±2947 |
| 75-79 | 314±1694 | 602±2671 | 1354±5717 | 1506±6669 | 1328±5159 | 729±2795 | 816±3977 | 1505±4664 | 727±3651 | 306±2025 | 363±1468 | 812±3788 |
| 80+ | 1439±3694 | 1825±4789 | 3690±8694 | 1270±5502 | 2794±6796 | 3120±8114 | 1499±5675 | 4060±7657 | 925±3189 | 567±2506 | 1343±2971 | 2137±5882 |
| *Paid home care costs* | | | | | | | | | | | | |
| 65-69 | 12±218 | 0 | 82±835 | 0 | 50±705 | 0 | 9.9±172.0 | 148±986 | 0 | 0 | 0 | 28±471 |
| 70-74 | 20±245 | 30±481 | 142±1162 | 0 | 76±992 | 0 | 0 | 185±1097 | 0 | 0 | 0 | 44±609 |
| 75-79 | 16±254 | 148±1008 | 188±1402 | 121±1220 | 187±1257 | 31±416 | 0 | 397±1550 | 17±235 | 0 | 0 | 105±900 |
| 80+ | 90±572 | 294±1417 | 785±2851 | 94±1072 | 193±1366 | 40±444 | 0 | 1414±2710 | 0 | 0 | 0 | 289±1503 |
| *Total costs of social care* | | | | | | | | | | | | |
| 65-69 | 149±1143 | 278±2418 | 455±3013 | 272±2871 | 350±3079 | 428±2588 | 538±3809 | 746±3587 | 190±1952 | 184±2144 | 363±1562 | 330±2584 |
| 70-74 | 309±1763 | 442±2294 | 994±5110 | 604±3808 | 566±3269 | 773±3323 | 498±2810 | 1176±4840 | 437±2569 | 423±2951 | 544±2064 | 583±3168 |
| 75-79 | 330±1825 | 750±3073 | 1542±6367 | 1627±6970 | 1515±5583 | 760±2824 | 816±3977 | 1901±5455 | 743±3661 | 306±2025 | 363±1468 | 916±4122 |
| 80+ | 1529±3888 | 2120±5384 | 4475±10328 | 1363±5818 | 2987±7089 | 3160±8153 | 1499±5675 | 5474±9518 | 925±3189 | 567±2506 | 1343±2971 | 2426±6568 |

**Table 4.30. Cost of social care at the public level in 2008 international dollars in 2008 using the ILO average wage method, by site and dementia status**

| Types of informal care | Cuba | Dominican Republic | Peru (urban) | Peru (rural) | Venezuela | Mexico (urban) | Mexico (rural) | China (urban) | China (rural) | India (urban) | India (rural) | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *ADL costs* | | | | | | | | | | | | |
| Dementia | 2203±2889 | 2574±3926 | 5616±5957 | 3718±6161 | 1723±3984 | 2457±4249 | 2508±4677 | 8062±6535 | 4048±5595 | 1413±3687 | 1455±2389 | 2945±4597 |
| Questionable and mild | 898±1743 | 1618±3378 | 3650±5083 | 3147±6146 | 1023±2831 | 2092±3842 | 1993±4102 | 6566±6354 | 1998±4132 | 930±2858 | 1191±2183 | 1897±3842 |
| Moderate and severe | 4283±3124 | 5333±4119 | 9329±5759 | 8518±5442 | 3498±5656 | 4662±5813 | 8589±6493 | 10753±6065 | 10380±4832 | 6430±6609 | 5784±1273 | 6025±5195 |
| Non-dementia | 58±458 | 236±1243 | 303±1716 | 177±1280 | 88±807 | 225±1288 | 181±1179 | 592±2372 | 86±766 | 54±644 | 265±1116 | 189±1216 |
| *IADL costs* | | | | | | | | | | | | |
| Dementia | 1167±2150 | 1178±3187 | 2917±4968 | 1352±3692 | 1927±3789 | 2823±5392 | 600±1593 | 3160±5774 | 1713±4285 | 588±1417 | 430±754 | 1549±3568 |
| Questionable and mild | 608±1677 | 336±910 | 2028±4187 | 1329±3956 | 1281±2758 | 3026±5819 | 582±1658 | 2045±4669 | 690±2869 | 502±1372 | 376±722 | 1013±2925 |
| Moderate and severe | 2062±2503 | 3539±5373 | 4597±5871 | 2028±2868 | 3565±5316 | 1894±1856 | 1074±1278 | 5167±7008 | 4878±6207 | 1905±1993 | 1531±581 | 3145±4670 |
| Non-dementia | 34±532 | 42±383 | 130±898 | 140±1475 | 159±1129 | 201±1236 | 115±908 | 127±1075 | 40±466 | 18±206 | 91±416 | 91±824 |
| *Supervision costs* | | | | | | | | | | | | |
| Dementia | 795±2166 | 840±2813 | 3136±6278 | 958±2588 | 3582±6860 | 2072±5810 | 1276±4686 | 1096±3389 | 208±646 | 857±2623 | 210±1040 | 1389±4147 |
| Questionable and mild | 283±1335 | 265±1518 | 2195±5512 | 699±1899 | 2145±5178 | 1335±4073 | 907±4208 | 700±2583 | 36±230 | 633±2419 | 63±402 | 794±3180 |
| Moderate and severe | 1610±2878 | 2455±4510 | 4912±7254 | 2839±5288 | 7230±9019 | 6326±10841 | 5368±7815 | 1808±4456 | 727±1104 | 3811±4326 | 2382±3297 | 3133±5834 |
| Non-dementia | 15±359 | 13±227 | 102±996 | 139±1854 | 170±1447 | 173±1618 | 169±2055 | 44±904 | 7.7±170.3 | 47±825 | 24±414 | 74±1057 |
| *Informal care costs* | | | | | | | | | | | | |
| Dementia | 4164±5303 | 4591±7692 | 11669±13725 | 6028±10932 | 7232±10771 | 7351±10714 | 4383±9145 | 12317±10036 | 5968±8931 | 2858±6880 | 2095±3574 | 5883±9173 |
| Questionable and mild | 1790±3413 | 2219±4606 | 7874±12138 | 5175±10889 | 4448±8572 | 6453±9631 | 3481±8199 | 9311±7907 | 2725±6640 | 2065±5654 | 1630±2979 | 3704±7430 |
| Moderate and severe | 7954±5570 | 11327±10251 | 18838±13806 | 13385±11163 | 14293±12538 | 12883±14865 | 15031±12945 | 17728±11265 | 15985±7773 | 12146±12557 | 9697±3730 | 12304±10660 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Non-dementia | 107±936 | 291±1497 | 535±2960 | 456±3630 | 417±2612 | 598±3085 | 465±3098 | 763±3152 | 134±1120 | 119±1474 | 380±1630 | 354±2275 |
| *Paid home care costs* | | | | | | | | | | | | |
| Dementia | 236±871 | 618±2042 | 2190±4448 | 341±2044 | 565±2164 | 68±618 | 34±319 | 2934±3276 | 0 | 0 | 0 | 624±2177 |
| Questionable and mild | 79±454 | 268±1338 | 1608±3892 | 0 | 207±1072 | 5.4±48.1 | 0 | 2140±3092 | 0 | 0 | 0 | 338±1624 |
| Moderate and severe | 484±1243 | 1611±3109 | 3290±5216 | 2453±5485 | 1475±3565 | 425±1590 | 372±1051 | 4362±3157 | 0 | 0 | 0 | 1464±3160 |
| Non-dementia | 10±208 | 51±584 | 104±998 | 24±540 | 66±843 | 9.8±220.3 | 0 | 270±1308 | 3.5±108.7 | 0 | 0 | 50±627 |
| *Total costs of social care* | | | | | | | | | | | | |
| Dementia | 4400±5594 | 5210±8350 | 13859±15661 | 6368±11376 | 7797±11289 | 7420±10688 | 4418±9186 | 15251±11368 | 5968±8931 | 2858±6880 | 2095±3574 | 6507±10016 |
| Questionable and mild | 1869±3575 | 2487±5082 | 9481±14030 | 5175±10889 | 4655±8824 | 6458±9632 | 3481±8199 | 11451±9613 | 2725±6640 | 2065±5654 | 1630±2979 | 4043±8070 |
| Moderate and severe | 8439±5856 | 12938±10628 | 22128±15373 | 15838±12636 | 15768±12941 | 13308±14550 | 15402±12945 | 22091±11213 | 15985±7773 | 12146±12557 | 9697±3730 | 13768±11523 |
| Non-dementia | 117±1000 | 342±1702 | 639±3410 | 480±3745 | 483±2906 | 608±3118 | 465±3098 | 1033±4048 | 137±1129 | 119±1474 | 380±1630 | 404±2519 |

**Table 4.31. Cost of social care at the public level in 2008 international dollars in 2008 using the ILO average wage method, by site and number of physical diseases**

| Types of informal care | Cuba | Dominican Republic | Peru (urban) | Peru (rural) | Venezuela | Mexico (urban) | Mexico (rural) | China (urban) | China (rural) | India (urban) | India (rural) | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *ADL costs* | | | | | | | | | | | | |
| 0 | 189±1010 | 196±1211 | 548±2427 | 239±1560 | 78±753 | 349±1709 | 216±1569 | 396±1957 | 46±479 | 156±1297 | 172±882 | 217±1376 |
| 1-2 | 302±1243 | 472±1864 | 802±2911 | 483±2422 | 129±982 | 473±2056 | 286±1441 | 1065±3364 | 716±2722 | 143±1047 | 384±1342 | 458±1997 |
| 3+ | 700±1907 | 1026±2653 | 1503±3800 | 1166±3700 | 259±1407 | 565±1972 | 956±3012 | 2564±5001 | 2161±4421 | 232±1488 | 851±1964 | 965±2865 |
| *IADL costs* | | | | | | | | | | | | |
| 0 | 107±728 | 77±623 | 234±1501 | 128±1284 | 221±1145 | 225±1316 | 68±531 | 176±1494 | 27±393 | 64±494 | 62±324 | 125±947 |
| 1-2 | 162±959 | 163±1162 | 366±1735 | 334±2237 | 156±1204 | 655±2943 | 131±812 | 263±1784 | 304±1587 | 53±388 | 132±491 | 222±1430 |
| 3+ | 366±1494 | 340±1771 | 887±3010 | 203±895 | 356±1872 | 547±1660 | 403±1779 | 878±3078 | 857±3797 | 58±372 | 241±632 | 462±2037 |
| *Supervision costs* | | | | | | | | | | | | |
| 0 | 79±794 | 104±1128 | 327±2371 | 219±2483 | 87±739 | 264±2428 | 121±1320 | 182±1736 | 17±233 | 107±947 | 36±535 | 127±1386 |
| 1-2 | 104±827 | 134±1122 | 332±1889 | 158±1075 | 345±2352 | 405±2318 | 306±2804 | 104±1066 | 27±234 | 124±1387 | 42±565 | 182±1556 |
| 3+ | 178±985 | 83±646 | 688±3013 | 203±1006 | 684±3037 | 453±2547 | 470±3092 | 65±940 | 0 | 0 | 64±326 | 334±2101 |
| *Informal care costs* | | | | | | | | | | | | |
| 0 | 375±1962 | 376±2459 | 1109±5329 | 587±4163 | 386±1938 | 838±4052 | 405±2856 | 754±3798 | 90±984 | 328±2449 | 270±1467 | 470±2930 |
| 1-2 | 568±2342 | 768±3393 | 1500±5617 | 974±5168 | 630±3784 | 1534±5429 | 722±3904 | 1432±4570 | 1046±4110 | 320±2537 | 559±1999 | 862±3820 |
| 3+ | 1245±3446 | 1449±3985 | 3078±8121 | 1572±5041 | 1299±4923 | 1566±5042 | 1829±6262 | 3507±7232 | 3018±6778 | 290±1860 | 1155±2697 | 1760±5305 |
| *Paid home care costs* | | | | | | | | | | | | |
| 0 | 11±161 | 46±571 | 255±1629 | 0 | 44±621 | 0 | 7.8±152.1 | 202±1129 | 0 | 0 | 0 | 48±641 |
| 1-2 | 40±383 | 99±826 | 345±1908 | 53±807 | 77±887 | 31±425 | 0 | 422±1614 | 12±204 | 0 | 0 | 107±918 |
| 3+ | 112±687 | 254±1334 | 317±1777 | 307±1939 | 130±1117 | 19±237 | 0 | 1017±2389 | 0 | 0 | 0 | 222±1280 |
| *Total costs of social care* | | | | | | | | | | | | |
| 0 | 386±2008 | 423±2724 | 1365±6386 | 587±4163 | 429±2149 | 838±4052 | 412±2896 | 956±4554 | 90±984 | 328±2449 | 270±1467 | 517±3229 |
| 1-2 | 609±2486 | 868±3619 | 1844±6536 | 1028±5364 | 707±4068 | 1565±5438 | 722±3904 | 1854±5704 | 1059±4116 | 320±2537 | 559±1999 | 969±4182 |
| 3+ | 1357±3762 | 1703±4580 | 3395±8973 | 1878±5986 | 1429±5224 | 1584±5138 | 1829±6262 | 4524±8674 | 3018±6778 | 290±1860 | 1155±2697 | 1982±5849 |

## Summary of this section

In this section, total costs, as well as the costs of medical care and social care, have been reported both at the private level and public level among the whole population. The main findings are summarised below:

- Cost are more frequently incurred for medical care than social care in the whole sample both at the private level and the public level.
- The distributions of costs of medical care and social care are different between the private and public levels. Costs of medical care are higher at the private level, while costs of social care are higher at the public level.
- The greater part of the cost of medical care comes from direct medical cost. For the costs of social care, the major costs are those for informal care, and within informal care costs the highest are for ADL. With some exceptions, paid home care costs are lower than the costs of informal care.
- Medication plays an important role in the cost of medical care at the private level. However, the prescription cost was not separately analysed at the public level as it was included in the cost of related services.
- Gender differences are not evident with regard to medical care and social care costs. Age is most clearly related to the cost of social care, while the relationship between age and medical care cost varies among sites.
- Participants with dementia have higher total costs and social costs, but not medical care costs. Costs increase with greater dementia severity.
- Physical disease is clearly associated with higher costs of medical care but is only modestly related to the cost of social care.

# Section 5. Costs of care for participants with dementia and predictors of cost

In the previous section, costs have been calculated for all participants. This section reports costs among participants with dementia both at the private level and the public level. Cost distributions are shown in for key characteristics, including socio-demographic factors, clinical features of dementia, physical and psychiatric comorbidities, and different levels of dependency. Potential predictors are identified from characteristics of both the participants and their carers. Regression models are used to identify significant predictors.

## 5.1 Methodology

### Cost generation and its distribution

Section 3 has described the methods for generating costs for each participant in the study. This section reports costs for those participants who had dementia. As with Sections 3 and 4, total cost was divided into the costs of medical care and social care. Cost of medical care was further divided into costs for direct medical care, non-direct care, and indirect care. Cost of social care was divided into informal care and paid care. Informal care cost was the sum of costs associated with ADL, IADL and supervision.

The cost data are summarised using means and standard deviations. Bar charts are provided to show the differences in cost among countries, and the distribution between formal and informal care costs. With regard to costs among participants with dementia, the following key factors were used to show the distribution of cost:

(1) Socio-demographic factors, including gender, age (65-69, 70-74, 75-79, 80+), education (no education, less than primary education, completed primary education, completed secondary education and higher education), marital status (single, married, other), whether the income was received by the participant (yes or no) and assets in

the family (below and above median level of assets in the sample for each country).
(2) Factors related to the symptoms of dementia included whether the participant had significant memory impairment (yes or no), number of impaired cognitive domains excluding memory (0 to 4), behavioural and psychological symptoms of dementia (BPSD) severity score (0, 1to 4, 5+), overall severity (questionable and mild, moderate, severe) and subtype of dementia (not allocated, pure Alzheimer's disease (AD), pure Vascular Dementia (VD), mixed AD/VAD, pure Dementia with Lewy bodies (DLB), mixed AD/DLB, frontotemporal dementia (FTD))
(3) Other factors included the number of physical impairments causing at least some difficulty (three groups: 0, 1-2, 3+), whether the participant had depression (yes or no), number of ADL care (0, 1-3, 4-5), number of IADL care (0, 1, 2) and whether supervision was needed (yes or no).

The cut-off point of assets was determined according to the distribution of assets in that country among all participants. The distributions of number of assets in all countries are described in Table 5.1. The cut-off point was determined according to the number which was the closest number to the 50% percentile.

Diagnoses of dementia, depression and chronic diseases have been described in section 2. Only a brief summary is provided in this section. In brief, dementia was diagnosed using the previously validated 10/66 dementia diagnostic algorithm and/or DSM IV dementia criteria. Information in terms of memory and cognition was obtained from the Geriatric Mental State and cognitive tests, including the Community Screening Instrument for Dementia (CSI-D), and the modified CERAD 10 word list learning task with delayed recall. Informant reports of cognitive and functional decline were obtained from the CSI-D. BPSD was collected from the Neuropsychiatric Inventory (NPI). The severity of dementia was defined according to the clinical dementia rating (CDR). History and aetiology of dementia was determined according to the ‘Dementia Diagnosis and Subtype (HAS-DDS)’ schedule.

Physical impairments were measured using self-report questions. Only when a participant identified a problem as causing at least some difficulty was the impairment included in the physical impairment variable. The domains of the

**Table 5.1. Distribution of number of assets, cumulative percentage by site**

| Type of Cost | Cuba | Dominican Republic | Peru (urban) | Peru (rural) | Venezuela | Mexico (urban) | Mexico (rural) | China (urban) | China (rural) | India (urban) | India (rural) | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Valid | 2936 | 2006 | 1381 | 552 | 1965 | 1003 | 1000 | 1159 | 1002 | 1001 | 999 | 15004 |
| Missing | 8 | 5 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 4 | 0 | 18 |
| Number of assets | | | | | | | | | | | | |
| 0 | 0.3% | 0.3% | 0.1% | 0.7% | 2.0% | 0.2% | 0.9% | 0% | 0% | 1.3% | 6.6% | 1.0% |
| 1 | 0.5% | 2.2% | 0.2% | 3.3% | 0% | 0.4% | 9.4% | 0% | 0% | 4.2% | 20.9% | 3.1% |
| 2 | 1.0% | 6.8% | 0.4% | 6.9% | 0% | 1.3% | 21.3% | 0% | 1.5% | 13.2% | 44.4% | 7.1% |
| 3 | 2.7% | 15.2% | 0.4% | 16.1% | 0% | 3.8% | 39.4% | 0.4% | 10.8% | 36.4% | 68.5% | 14.1% |
| 4 | 8.7% | 32.1% | 1.4% | 36.2% | 0% | 7.5% | 56.6% | 3.3% | 22.2% | 62.1% | 88.7% | 23.8% |
| 5 | 35.3% | 54.2% | 4.8% | 69.0% | 2.4% | 16.3% | 73.1% | 52.1% | 38.8% | 75.1% | 95.7% | 41.4% |
| 6 | 84.2% | 90.7% | 78.9% | 98.0% | 68.5% | 65.4% | 94.4% | 95.2% | 66.8% | 95.7% | 98.3% | 83.8% |
| 7 | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% |
| Cut-off point for 50% level of Assets | 5 | 5 | 6 | 4 | 6 | 6 | 4 | 5 | 5 | 4 | 2 | 5 |

impairments included problems with arthritis, vision, hearing problem, coughing, breathing, blood pressure, heart, gastrointestinal system, limbs and skin. Depression was measured according to a structured clinical interview, the Geriatric Mental State Examination and it was described according to the classification and definition of ICD-10.

Total cost, cost for medical care and cost for social care both in private level and public level are described for each characteristic.

## Identification of cost predictors

*Statistical methods*

From observing the distribution of costs across the sample, it is clear that these data are highly skewed and that there are a large number with zero cost (Figure 4 and Figure 5).

Figure 4. Distribution of cost at the private level

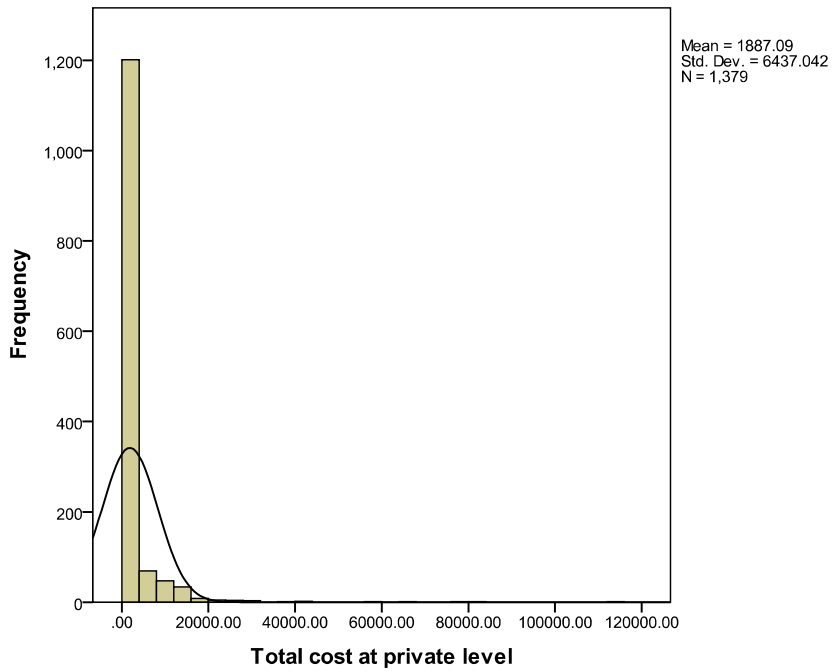
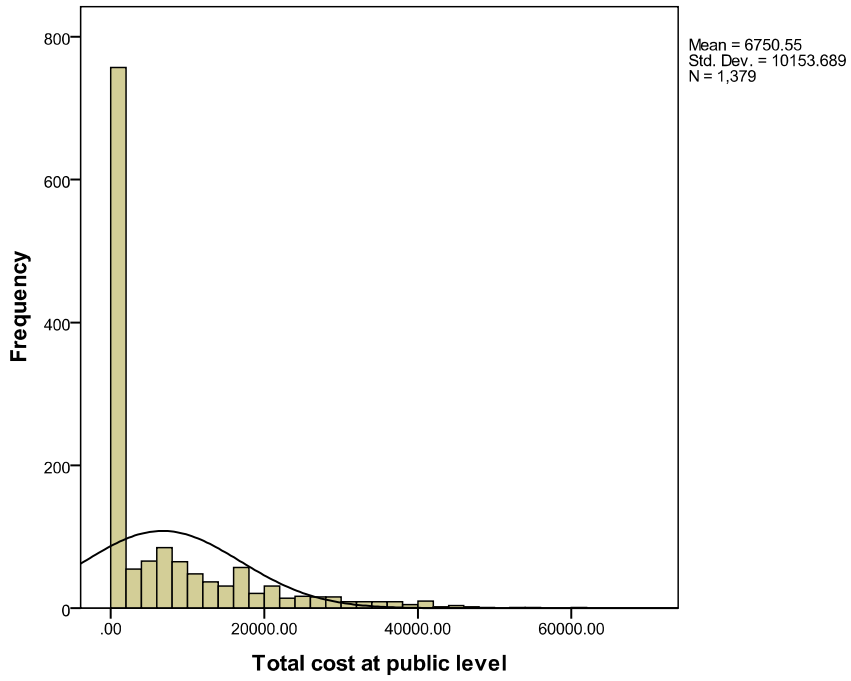


Figure 5. Distribution of cost at the public level




If this results in similarly distributed regression residuals then the widely-used ordinary least squares (OLS) linear regression model is not applicable as this assumes normally distributed residuals. Statistical methods which can deal with data with excessive zeros include zero-inflated negative binomial regression (ZINB) (Sousa et al., 2009), quantile regression (QR) (Koenker and Bassett, 1978), and two-part models (Katon et al., 2003; Willan and Briggs, 2006). Skewed data can be addressed by taking log transformations (Spottke et al., 2005) but this does not address the problem of excessive zeros and the results are difficult to interpret as it shows the mean of log cost. An alternative approach is to use bootstrapping which makes no assumptions about the underlying data distribution(Dodd et al., 2006). Bootstrapping is a method of randomly repeated independent sampling with replacement from the original database. After the bootstrapping procedure, simulated samples of the same size as the original database can be created and used for constructing confidence intervals and conducting statistical tests. This method allows linear regression to be used and so the regression coefficients represent the attributable cost of an independent variable when it changes one unit. Therefore, bootstrapped linear regression was used in modelling cost and was also used in Section 6 when estimating the attributable cost of dementia. In the bootstrapped models 1000 resamples were drawn and 95% confidence intervals for coefficients

were estimated according to the percentile method.

*Potential predictors of cost*

Variables that were seen as potential predictors of cost related to the characteristics of both the participants and their carers. Clinical and demographic predictors were considered. Details follow below.

i. Demographic characteristics of the participants: gender, age, education, marital status, income, family assets. These were categorical variables with the exception of age and assets which were treated as continuous in the regression analysis.
ii. Living arrangements of the participants: general arrangements (alone, with spouse only, with children, with other), living with children under 16 years old (yes/no)
iii. Whether participants have private health insurance (yes/no)
iv. Demographic characteristics of carers: gender, age (continuous), education (less than primary, completed primary, completed secondary, completed tertiary), marital status (single, married, other), in paid work (yes/no), relationship to the participants (spouse, child, child in law, other relative, non-relative).
v. Symptoms of dementia: memory impairment score (continuous), number of impaired cognitive domains excluding memory, BPSD severity score (continuous).
vi. Other mental or physical health problems: depression, hypertension (self-reported hypertension and/ or a blood pressure measurement meeting the World Health Organization/International Society of Hypertension criteria of SBP >= 140 mm Hg and/or diastolic blood pressure >= 90mm Hg), diabetes (self-reported), ischemic heart disease (self-reported), stroke (self-reported), COPD (self-reported), number of physical impairments causing at least some difficulty. All except the final variable were dichotomous variables (yes/no).

The CDR severity of dementia was not included as it was expected to be collinear with other dementia-related variables. The subtype of dementia would have been useful to include but many of the participants with dementia (26.2% to 83.3% across the seven countries) did not describe themselves as having a specific subtype of dementia.
In the model, all of the categorical variables were changed to dummy variables. This entailed leaving out one category against which the others were compared.

*Dependent variables*

Costs both at both the private level and the public level were analysed. For each level, four regression models were generated relating to the costs of medical care, social care, informal care, and total cost. Costs for paid care were same for both levels and so only one model relating to paid care was generated.

## 5.2 Results

**Private level care costs for participants with dementia, by site**

The numbers and percentages of participants with dementia incurring a cost at the private level are described in Table 5.2. The figures for medical care are much higher than for social care. Urban China has the highest percentage of participants incurring private level costs for both medical care and social care, while rural India and rural Peru have the lowest percentages for medical care and social care in respectively. Very few participants used paid care in rural Peru, Mexico, rural China or India.

Private level care costs among these participants with across the seven countries are shown in Table 5.3. The total cost per capita at the private level in the sample as a whole is I$1,887. Of the total cost, 70.8% is due to social care, and 53.3% of social care cost is due to informal care. Cost varies across countries, ranging from I$170 in urban and rural India to I$8597 in urban China. Rural India has the lowest cost for medical care and urban India has the lowest cost for social care. Urban China has the highest cost for medical care and social care. Urban Peru has the second highest total cost, particularly due to the large contribution of paid care. A comparison of total costs across countries is further illustrated in Figure 6.

Costs for medical care are particularly due to direct medical costs in every country. Across the whole sample, the cost for social care is about two-thirds of the total cost, and the costs for informal care and paid care are similar. However, the situation regarding paid care varies across countries. There is no paid care in rural China and India and the cost is very low in Mexico, but very high in urban Peru and urban China. The proportion of total cost due to each component is shown in Figure 7.

**Table 5.2. Number (%) of participants with dementia incurring private-level costs, by site**

| Type of Cost | Cuba | Dominican Republic | Peru (urban) | Peru (rural) | Venezuela | Mexico (urban) | Mexico (rural) | China (urban) | China (rural) | India (urban) | India (rural) | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Medical care* | | | | | | | | | | | | |
| Direct medical cost | 222 (68.7%) | 169 (69.8%) | 22 (16.9%) | 10 (27.8%) | 88 (60.7%) | 50 (53.8%) | 35 (40.2%) | 65 (77.4%) | 29 (51.8%) | 25 (33.3%) | 49 (45.4%) | 764 (55.4%) |
| Direct non-medical cost | 22 (6.8%) | 65 (26.9%) | 29 (22.3%) | 12 (33.3%) | 27 (18.6%) | 37 (39.8%) | 22 (25.3%) | 18 (21.4%) | 2 (3.6%) | 16 (21.3%) | 51 (47.2%) | 301 (21.8%) |
| Indirect cost of carers | 32 (9.9%) | 28 (11.6%) | 6 (4.6%) | 4 (11.1%) | 12 (8.3%) | 9 (9.7%) | 5 (5.7%) | 5 (6.0%) | 1 (1.8%) | 4 (5.3%) | 21 (19.4%) | 127 (9.2%) |
| Total cost for medical care | 229 (70.9%) | 177 (73.1%) | 42 (32.3%) | 15 (41.7%) | 94 (64.8%) | 64 (68.8%) | 42 (48.3%) | 65 (77.4%) | 29 (51.8%) | 32 (42.7%) | 61 (56.5%) | 850 (61.6%) |
| *Informal care* | | | | | | | | | | | | |
| ADL costs | 44 (13.6%) | 30 (12.4%) | 6 (4.6%) | 3 (8.3%) | 8 (5.5%) | 9 (9.7%) | 3 (3.4%) | 7 (8.3%) | 10 (17.9%) | 1 (1.3%) | 15 (13.9%) | 136 (9.9%) |
| IADL costs | 41 (12.7%) | 21 (8.7%) | 5 (3.8%) | 3 (8.3%) | 10 (6.9%) | 5 (5.4%) | 1 (1.1%) | 4 (4.8%) | 6 (10.7%) | 2 (2.7%) | 15 (13.9%) | 113 (8.2%) |
| Supervision costs | 22 (6.8%) | 9 (3.7%) | 5 (3.8%) | 3 (8.3%) | 11 (7.6%) | 6 (6.5%) | 2 (2.3%) | 1 (1.2%) | 3 (5.4%) | 2 (2.7%) | 5 (4.6%) | 69 (5.0%) |
| *Informal care costs* | 48 (14.9%) | 32 (13.2%) | 6 (4.6%) | 3 (8.3%) | 14 (9.7%) | 10 (10.8%) | 3 (3.4%) | 8 (9.5%) | 10 (17.9%) | 2 (2.7%) | 15 (13.9%) | 151 (10.9%) |
| *Paid care* | 27 (8.4%) | 24 (9.9%) | 29 (22.3%) | 1 (2.8%) | 14 (9.7%) | 2 (2.2%) | 1 (1.1%) | 38 (45.2%) | 0 (0%) | 0 (0%) | 0 (0%) | 136 (9.9%) |
| *Total costs of social care* | 63 (19.5%) | 43 (17.8%) | 30 (23.1%) | 3 (8.3%) | 23 (15.9%) | 11 (11.8%) | 4 (4.6%) | 42 (50.0%) | 10 (17.9%) | 2 (2.7%) | 15 (13.9%) | 246 (17.8%) |
| *Total cost* | 238 (73.7%) | 185 (76.4%) | 62 (47.7%) | 16 (44.4%) | 104 (71.7%) | 68 (73.1%) | 43 (49.4%) | 74 (88.1%) | 33 (58.9%) | 32 (42.7%) | 66 (61.1%) | 921 (66.8%) |

**Table 5.3. Private level mean and standard deviation costs in 2008 international dollars among participants with dementia, by site**

| Type of Cost | Cuba | Dominican Republic | Peru (urban) | Peru (rural) | Venezuela | Mexico (urban) | Mexico (rural) | China (urban) | China (rural) | India (urban) | India (rural) | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Medical care* | | | | | | | | | | | | |
| Direct medical costs | 121±241 | 19±47 | 94±380 | 17±47 | 1524±10083 | 246±438 | 336±1573 | 4584±11109 | 255±706 | 82±489 | 27±63 | 535±4421 |
| Direct non-medical costs | 18±102 | 2.1±13.5 | 14±36 | 16±31 | 27±125 | 13±25 | 27±88 | 15±51 | 1.1±5.7 | 14±76 | 6.4±11.7 | 14±73 |
| Indirect cost of carers | 1.8±8.1 | 3.3±29.1 | 1.3±8.5 | 2.6±9.9 | 1.7±8.1 | 1.8±6.6 | 1.2±6.6 | 1.1±5.0 | 0.1±0.8 | 0.2±1.0 | 0.9±4.4 | 1.7±13.7 |
| Total cost for medical care | 141±264 | 25±62 | 109±393 | 36±74 | 1552±10108 | 260±443 | 364±1585 | 4600±11130 | 256±710 | 96±564 | 34±71 | 551±4432 |
| Social care | | | | | | | | | | | | |
| *Informal care* | | | | | | | | | | | | |
| ADL costs | 627±2110 | 293±1390 | 504±4031 | 296±1130 | 278±1375 | 509±1832 | 44±239 | 713±2869 | 334±1010 | 33±288 | 85±256 | 385±1988 |
| IADL costs | 314±1353 | 100±529 | 207±1621 | 116±453 | 217±881 | 264±1739 | 9.6±89.3 | 236±1448 | 159±756 | 28±173 | 28±86 | 179±1084 |
| Supervision costs | 284±2761 | 63±399 | 134±1193 | 143±602 | 308±1346 | 108±527 | 65±521 | 114±1045 | 19±100 | 8.3±51.0 | 23±148 | 148±1502 |
| *Informal care costs* | 1225±4791 | 456±1834 | 844±6840 | 554±2176 | 803±2984 | 881±2937 | 118±737 | 1063±4674 | 512±1539 | 70±476 | 136±436 | 712±3686 |
| *Paid care* | 236±871 | 618±2042 | 2190±4448 | 341±2044 | 565±2164 | 68±618 | 34±319 | 2934±3276 | 0 | 0 | 0 | 624±2177 |
| *Total costs for social care* | 1461±5032 | 1074±2997 | 3034±8636 | 895±3187 | 1368±3986 | 949±2996 | 152±798 | 3997±5848 | 512±1539 | 70±476 | 136±436 | 1336±4501 |
| *Total cost* | 1601±5069 | 1099±3012 | 3143±8621 | 931±3186 | 2920±10758 | 1209±2953 | 516±1755 | 8597±12783 | 768±1768 | 166±731 | 171±442 | 1887±6437 |

**Figure 6. Total mean private level cost of care for participants with dementia, by site**

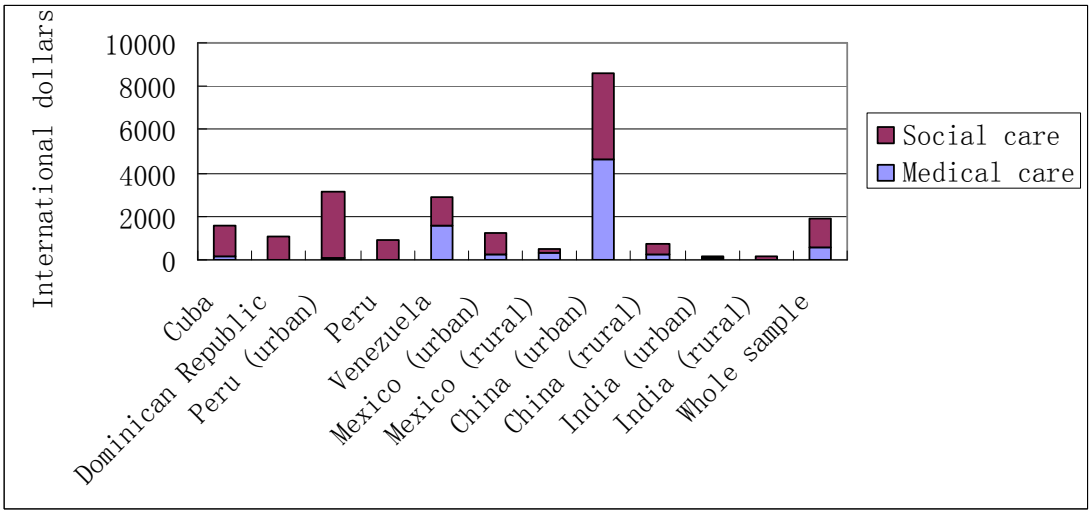



**Figure 7. The distribution of private level care costs for participants with dementia, by site**

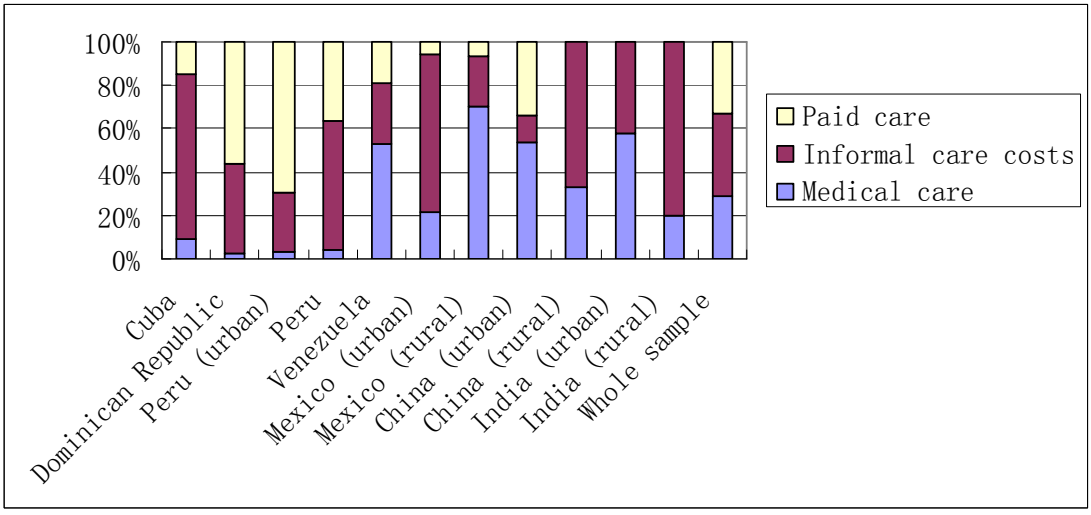
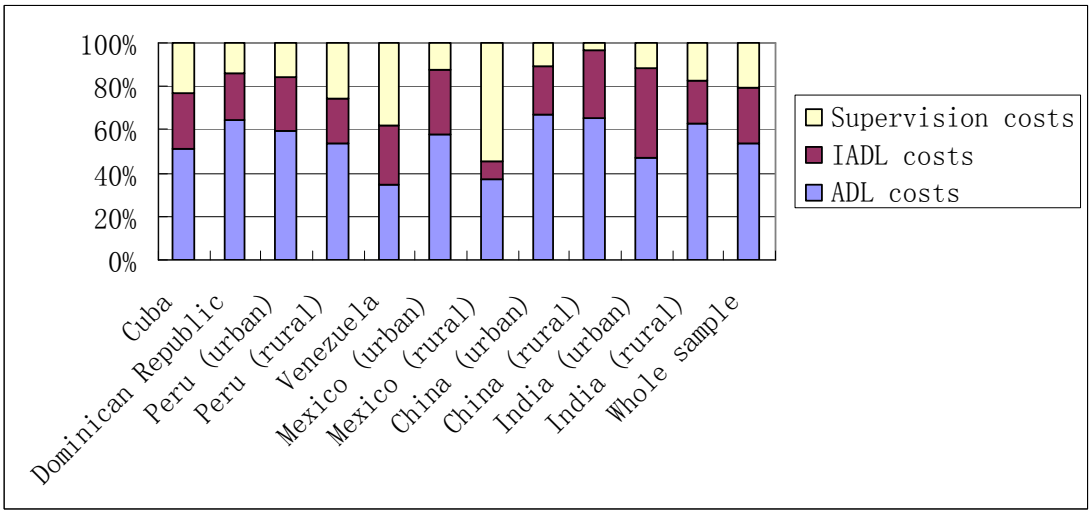



**Figure 8. The distribution of private level informal care costs for participants with dementia, by site**



With regard to informal care, the cost for help with ADL is higher than the cost for help with IADL and supervision, except in Venezuela and rural Mexico where the cost for supervision is the highest cost component of informal care. The distribution of informal care costs by site is summarised in Figure 8.

**Public level care costs for participants with dementia, by site**

The numbers and percentages of participants who have dementia incurring public level costs are shown in Table 5.4. In contrast to the findings at the private level, the figures for medical care are more similar to those for social care. Urban Mexico and urban China have the highest rates of medical care and social care costs at this level respectively. Rural China and urban India have the lowest percentages of participants with dementia incurring medical care and social care costs respectively.

Public level costs among participants with dementia across the seven countries are detailed in Table 5.5. The total cost per capita at the public level in the sample as a whole is I$6570. Nearly all (96.4%) of the total is due to social care, and 90.4% of the cost of social care is due to informal care. Cost varies across countries, ranging from I$2162 in urban and rural India to I$15,894 in urban China. In comparison to the private level, the variation in medical care costs between the countries is less at this level. Here, the cost for medical care is smaller component of total cost than at the private level. Urban India has the lowest cost for medical care and social care, while urban China has the highest cost for medical care and social care. Urban Peru has the second highest total cost, and this is due to the contribution of informal care. Comparisons of the total mean costs across countries are shown in Figure 9.

Similar to the results at the private level, the cost for medical care is mainly related to direct medical costs. However, in the whole sample the cost for social care is here the largest component of total cost. Paid care only represents one-tenth of the cost for social care. The distribution of total cost is described in Figure 10.

With regard to informal care, the cost for help with ADL remains higher than the cost for help with IADL and supervision with the exception of Venezuela, where the cost for supervision is the major contributor to total informal care costs. The distribution of informal care costs is illustrated in Figure 11.

**Table 5.4. Number (%) of participants with dementia incurring public-level costs, by site**

| Type of Cost | Cuba | Dominican Republic | Peru (urban) | Peru (rural) | Venezuela | Mexico (urban) | Mexico (rural) | China (urban) | China (rural) | India (urban) | India (rural) | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Medical care* | | | | | | | | | | | | |
| Direct medical cost | 136 (42.1%) | 103 (42.6%) | 45 (34.6%) | 12 (33.3%) | 60 (41.4%) | 60 (64.5%) | 51 (58.6%) | 37 (44.0%) | 7 (12.5%) | 25 (33.3%) | 60 (55.6%) | 596 (43.2%) |
| Direct non-medical cost | 22 (6.8%) | 65 (26.9%) | 29 (22.3%) | 12 (33.3%) | 27 (18.6%) | 37 (39.8%) | 22 (25.3%) | 18 (21.4%) | 2 (3.6%) | 16 (21.3%) | 51 (47.2%) | 301 (21.8%) |
| Indirect cost of carers | 116 (35.9%) | 94 (38.8%) | 34 (26.2%) | 13 (36.1%) | 55 (37.9%) | 57 (61.3%) | 43 (49.4%) | 31 (36.9%) | 5 (8.9%) | 25 (33.3%) | 52 (48.1%) | 525 (38.1%) |
| Total cost of medical care | 140 (43.3%) | 113 (46.7%) | 49 (37.7%) | 14 (38.9%) | 64 (44.1%) | 64 (68.8%) | 52 (59.8%) | 37 (44.0%) | 7 (12.5%) | 27 (36.0%) | 62 (57.4%) | 629 (45.6%) |
| *Informal care* | | | | | | | | | | | | |
| ADL costs | 151 (46.7%) | 94 (38.8%) | 71 (54.6%) | 11 (30.6%) | 41 (28.3%) | 33 (35.5%) | 24 (27.6%) | 64 (76.2%) | 27 (48.2%) | 12 (16.0%) | 32 (29.6%) | 560 (40.6%) |
| IADL costs | 137 (42.4%) | 64 (26.4%) | 60 (46.2%) | 8 (22.2%) | 45 (31.0%) | 39 (41.9%) | 14 (16.1%) | 41 (48.8%) | 15 (26.8%) | 14 (18.7%) | 30 (27.8%) | 467 (33.9%) |
| Supervision costs | 75 (23.2%) | 30 (12.4%) | 61 (46.9%) | 7 (19.4%) | 51 (35.2%) | 28 (30.1%) | 12 (13.8%) | 12 (14.3%) | 6 (10.7%) | 11 (14.7%) | 8 (7.4%) | 301 (21.8%) |
| *Informal care costs* | 165 (51.1%) | 97 (40.1%) | 74 (56.9%) | 11 (30.6%) | 67 (46.2%) | 48 (51.6%) | 24 (27.6%) | 69 (82.1%) | 27 (48.2%) | 15 (20.0%) | 32 (29.6%) | 629 (45.6%) |
| *Paid care* | 27 (8.4%) | 24 (9.9%) | 29 (22.3%) | 1 (2.8%) | 14 (9.7%) | 2 (2.2%) | 1 (1.1%) | 38 (45.2%) | 0 (0%) | 0 (0%) | 0 (0%) | 136 (9.9%) |
| *Total costs of social care* | 165 (51.1%) | 99 (40.9%) | 74 (56.9%) | 11 (30.6%) | 69 (47.6%) | 49 (52.7%) | 24 (27.6%) | 71 (84.5%) | 27 (48.2%) | 15 (20.0%) | 32 (29.6%) | 636 (46.1%) |
| *Total cost* | 230 (71.2%) | 165 (68.2%) | 92 (70.8%) | 21 (58.3%) | 104 (71.7%) | 79 (84.9%) | 61 (70.1%) | 74 (88.1%) | 28 (50.0%) | 35 (46.7%) | 71 (65.7%) | 960 (69.6%) |

**Table 5.5. Public level mean and standard deviation costs in 2008 international dollars among participants with dementia, by site**

| Type of Cost | Cuba | Dominican Republic | Peru (urban) | Peru (rural) | Venezuela | Mexico (urban) | Mexico (rural) | China (urban) | China (rural) | India (urban) | India (rural) | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Medical care* | | | | | | | | | | | | |
| Direct medical costs | 91±201 | 156±366 | 143±331 | 112±204 | 571±2963 | 278±452 | 459±1619 | 608±2052 | 24±75 | 35±166 | 47±109 | 216±1197 |
| Direct non-medical costs | 18±102 | 2.1±13.5 | 14±36 | 16±31 | 27±125 | 13±25 | 27±88 | 15±51 | 1.1±5.7 | 14±76 | 6.4±11.7 | 14±73 |
| Indirect cost of carers | 5.4±12.6 | 9.9±20.1 | 11±25 | 19±35 | 24±48 | 23±32 | 21±44 | 21±48 | 2.2±8.1 | 8.2±17.8 | 14±28 | 13±30 |
| Total cost of medical care | 114±254 | 168±385 | 167±368 | 148±256 | 622±3008 | 313±488 | 508±1641 | 643±2061 | 27±88 | 57±208 | 67±142 | 243±1219 |
| *Informal care* | | | | | | | | | | | | |
| ADL costs | 2203±2889 | 2574±3926 | 5616±5957 | 3718±6161 | 1723±3984 | 2457±4249 | 2508±4677 | 8062±6535 | 4048±5595 | 1413±3687 | 1455±2389 | 2945±4597 |
| IADL costs | 1167±2150 | 1178±3187 | 2917±4968 | 1352±3692 | 1927±3789 | 2823±5392 | 600±1593 | 3160±5774 | 1713±4285 | 588±1417 | 430±754 | 1549±3568 |
| Supervision costs | 795±2166 | 840±2813 | 3136±6278 | 958±2588 | 3582±6860 | 2072±5810 | 1276±4686 | 1096±3389 | 208±646 | 857±2623 | 210±1040 | 1389±4147 |
| *Informal care costs* | 4164±5303 | 4591±7692 | 11669±13725 | 6028±10932 | 7232±10771 | 7351±10714 | 4383±9145 | 12317±10036 | 5968±8931 | 2858±6880 | 2095±3574 | 5883±9173 |
| *Paid care* | 236±871 | 618±2042 | 2190±4448 | 341±2044 | 565±2164 | 68±618 | 34±319 | 2934±3276 | 0 | 0 | 0 | 624±2177 |
| *Total costs of social care* | 4400±5594 | 5210±8350 | 13859±15661 | 6368±11376 | 7797±11289 | 7420±10688 | 4418±9186 | 15251±11368 | 5968±8931 | 2858±6880 | 2095±3574 | 6507±10016 |
| *Total cost* | 4514±5593 | 5378±8354 | 14026±15641 | 6516±11376 | 8419±11769 | 7733±10736 | 4925±9539 | 15894±11615 | 5995±8951 | 2915±6902 | 2162±3640 | 6750±10154 |

**Figure 9. Total mean public level cost of care for participants with dementia, by site**

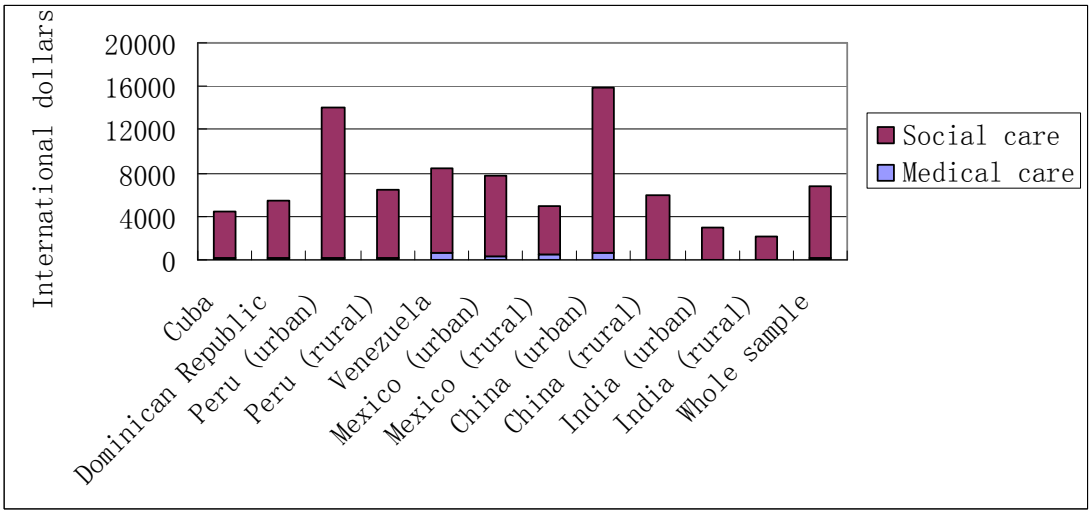



**Figure 10. The distribution of public level care costs for participants with dementia, by site**

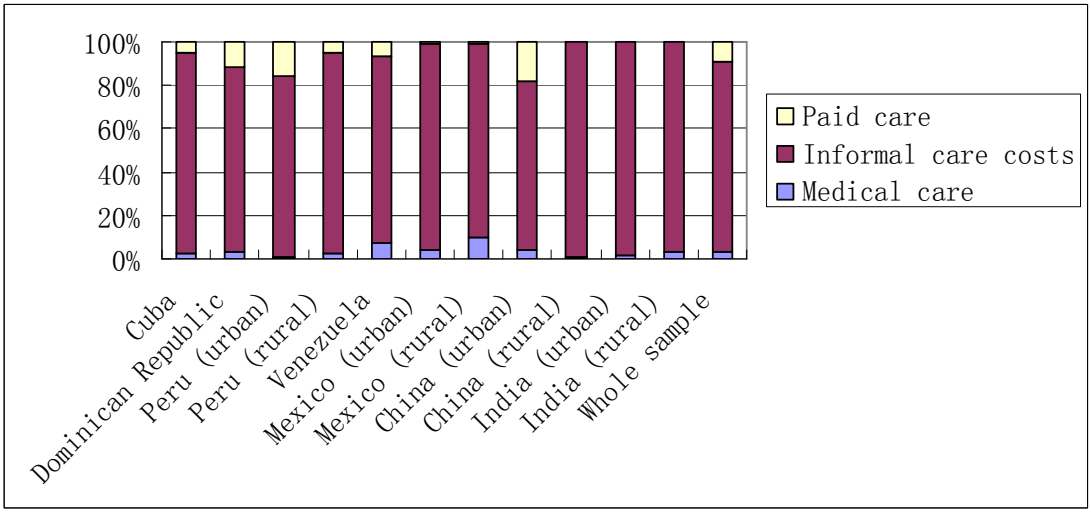
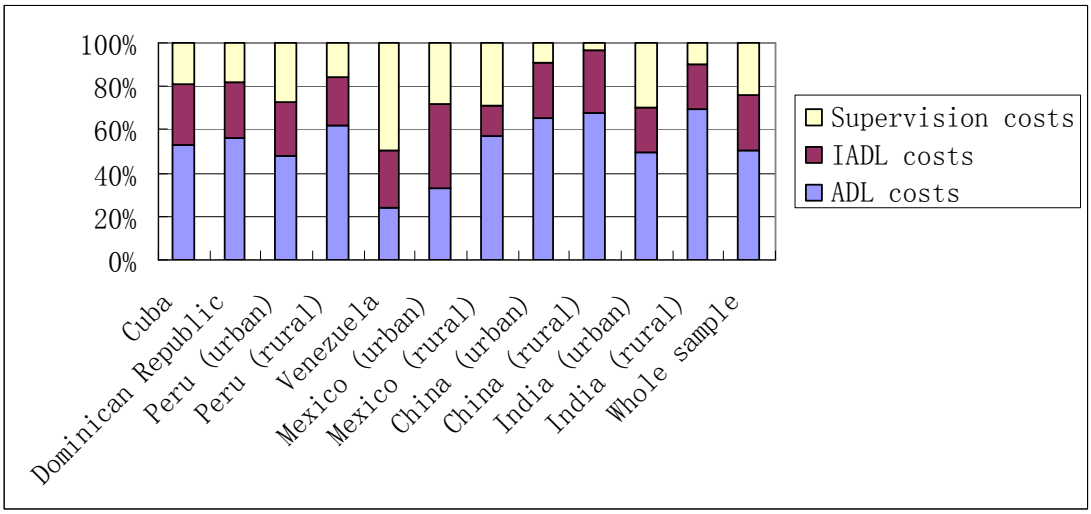



**Figure 11. The distribution of public level informal care costs for participants with dementia, by site**



**Cost distribution**

The relationships between the cost for medical care, cost for social care, and total cost at both the private and public levels and the participant characteristics described earlier are detailed in Tables 5.6 to 5.21. Detailed descriptions of cost distribution is not included in the thesis, as the main objective here is to identify predictors of cost. The figures for each site in different categories presented in these tables can be as a reference source for future cost-of-illness studies, but caution is required as the sample size sometimes is limited.

From these tables the following key findings have emerged:

- There is no big difference in costs between men and women in each country (Table 5.6).
- There is no tendency for cost at the private level to change with increasing age. However, this relationship is apparent for costs of social cares and total costs at the public level (Table 5.7).
- Higher costs occur for those with higher levels of education (Table 5.8).
- Married participants have the highest costs than non-married participants, except for the cost of social care at the private level (Table 5.9).
- Present of participant income is related to cost only at the private level (Table 5.10).
- Wealthier families (defined according to the number of assets) tend to have higher costs than poorer families (Table 5.11).
- There is no major difference in cost between those participants with and without impaired memory (Table 5.12).
- Cognitive impairment (Table 5.13), BPSD severity (Table 5.14) and overall severity of dementia (Table 5.15) is related to the cost of social care but not the cost of medical care.
- Pure VD has the highest cost for medical care among different subtypes of dementia. Total costs among pure VD Mixed AD/DLB are higher than for other types of dementia (Table 5.16).
- Participants with more physical impairments have higher costs (Table 5.17).

**Table 5.6. Cost differences (in 2008 international dollars) between female and male participants with dementia, by site**

| Gender | Cuba | Dominican Republic | Peru (urban) | Peru (rural) | Venezuela | Mexico (urban) | Mexico (rural) | China (urban) | China (rural) | India (urban) | India (rural) | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Private level-total cost* | | | | | | | | | | | | |
| Male | 1448±3858 | 693±2097 | 3473±12744 | 536±1724 | 3507±18794 | 1014±2200 | 879±2687 | 8948±15408 | 838±1926 | 77±262 | 229±469 | 1965±8553 |
| Female | 1667±5515 | 1275±3320 | 2975±5527 | 1128±3728 | 2360±5930 | 1277±3184 | 305±799 | 8380±11022 | 720±1678 | 219±901 | 150±432 | 1794±5155 |
| Private level-*Medical care cost* | | | | | | | | | | | | |
| Male | 118±165 | 18±27 | 120±427 | 38±101 | 3313±18786 | 355±571 | 662±2520 | 6168±13891 | 336±1021 | 29±68 | 41±76 | 877±6860 |
| Female | 150±296 | 28±72 | 104±378 | 35±58 | 1281±4801 | 227±389 | 191±520 | 3635±9046 | 201±376 | 135±711 | 32±70 | 415±2711 |
| *Private level- social care cost* | | | | | | | | | | | | |
| Male | 1329±3763 | 675±2087 | 3353±12750 | 499±1728 | 194±1179 | 659±2237 | 216±1067 | 2780±4116 | 503±1662 | 48±252 | 188±468 | 1088±4810 |
| Female | 1517±5494 | 1247±3305 | 2871±5558 | 1093±3729 | 1080±3388 | 1050±3227 | 115±596 | 4746±6623 | 518±1474 | 83±571 | 118±424 | 1379±4258 |
| *Public level-total cost* | | | | | | | | | | | | |
| Male | 4149±6071 | 5228±8572 | 11455±15152 | 9341±14002 | 4316±8216 | 8261±11038 | 4813±9253 | 13645±11227 | 8367±11201 | 3824±7948 | 3053±4265 | 6350±9889 |
| Female | 4671±5381 | 5443±8282 | 15342±15810 | 5104±9845 | 7277±11183 | 7550±10706 | 4990±9784 | 17278±11739 | 4342±6678 | 2373±6224 | 1835±3353 | 6623±10013 |
| *Public level- medical care cost* | | | | | | | | | | | | |
| Male | 115±209 | 192±335 | 211±473 | 46±105 | 288±582 | 388±657 | 679±2454 | 902±2441 | 27±79 | 82±271 | 97±220 | 258±1016 |
| Female | 114±272 | 158±405 | 145±302 | 199±293 | 994±4001 | 288±416 | 408±895 | 483±1796 | 27±95 | 42±160 | 56±99 | 244±1320 |
| *Public level- social care cost* | | | | | | | | | | | | |
| Male | 4034±6077 | 5036±8580 | 11244±15237 | 9295±13929 | 4028±8077 | 7873±10875 | 4133±9088 | 12743±10562 | 8340±11190 | 3743±7917 | 2956±4133 | 6092±9775 |
| Female | 4557±5380 | 5285±8274 | 15197±15793 | 4905±9871 | 6283±10107 | 7262±10698 | 4583±9322 | 16794±11668 | 4315±6644 | 2331±6212 | 1779±3318 | 6380±9849 |

**Table 5.7. Cost differences (in 2008 international dollars) between participants with dementia in different age groups, by site**

| Age groups | Cuba | Dominican Republic | Peru (urban) | Peru (rural) | Venezuela | Mexico (urban) | Mexico (rural) | China (urban) | China (rural) | India (urban) | India (rural) | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Private level-total cost* | | | | | | | | | | | | |
| 65-69 | 1164±2953 | 111±449 | 2181±4212 | 33±66 | 844±2603 | 169±239 | 1360±1864 | 6152±3462 | 2014±3030 | 24±55 | 138±455 | 955±2531 |
| 70-74 | 2034±4056 | 265±1292 | 9754±25873 | 761±2118 | 3685±7087 | 1228±2949 | 200±454 | 6985±11239 | 1316±2039 | 216±855 | 205±489 | 1772±6757 |
| 75-79 | 1607±3576 | 1066±2685 | 2892±6165 | 31±37 | 8913±23558 | 1772±3302 | 308±764 | 5985±7995 | 588±1780 | 636±1597 | 49±90 | 2252±8274 |
| 80+ | 1546±5842 | 1503±3588 | 2587±4933 | 1801±4642 | 1493±3911 | 866±2676 | 594±2176 | 10372±15230 | 265±690 | 64±261 | 229±502 | 1975±6092 |
| *Private level- medical care cost* | | | | | | | | | | | | |
| 65-69 | 156±160 | 14±19 | 236±718 | 33±66 | 188±294 | 169±239 | 99±142 | 1944±3024 | 360±572 | 24±55 | 32±53 | 200±783 |
| 70-74 | 163±334 | 21±78 | 281±651 | 13±24 | 746±1474 | 145±237 | 200±454 | 4756±11434 | 613±1432 | 29±77 | 38±83 | 410±2737 |
| 75-79 | 162±225 | 16±26 | 257±636 | 31±37 | 6480±23534 | 216±473 | 308±764 | 3308±6181 | 220±413 | 636±1597 | 49±90 | 960±7468 |
| 80+ | 128±264 | 31±70 | 34±93 | 52±103 | 594±3005 | 320±484 | 455±2029 | 5450±13209 | 63±121 | 15±25 | 21±49 | 516±3748 |
| *Private level- social care cost* | | | | | | | | | | | | |
| 65-69 | 1008±2912 | 97±446 | 1945±4271 | 0 | 656±2635 | 0 | 1261±1731 | 4208±4051 | 1654±3033 | 0 | 106±454 | 754±2393 |
| 70-74 | 1872±4034 | 244±1288 | 9473±25935 | 748±2117 | 2938±7163 | 1082±2988 | 0 | 2229±3292 | 703±1545 | 186±854 | 166±492 | 1362±6208 |
| 75-79 | 1444±3488 | 1050±2678 | 2635±6231 | 0 | 2433±4906 | 1556±3363 | 0 | 2677±3862 | 367±1505 | 0 | 0 | 1292±3482 |
| 80+ | 1418±5810 | 1472±3570 | 2553±4943 | 1749±4649 | 899±2662 | 546±2694 | 139±855 | 4922±7006 | 202±694 | 49±257 | 208±478 | 1459±4504 |
| *Public level-total cost* | | | | | | | | | | | | |
| 65-69 | 3178±4022 | 5272±10716 | 7347±12619 | 152±235 | 5268±12110 | 9496±13430 | 22258±20462 | 17982±10489 | 10984±12055 | 1098±3971 | 1939±3457 | 5378±10287 |
| 70-74 | 4046±5112 | 3832±6857 | 18350±17797 | 9683±13445 | 6702±11608 | 4170±6407 | 1905±5751 | 13986±12302 | 8623±9750 | 5353±10066 | 2450±4316 | 5485±9094 |
| 75-79 | 3030±4917 | 4224±6763 | 15859±15088 | 3006±5072 | 12294±13611 | 4602±5646 | 6624±11301 | 14404±9556 | 5909±9597 | 3870±7181 | 1183±2800 | 6492±9834 |
| 80+ | 5177±5927 | 6283±8837 | 13569±15799 | 9011±13645 | 8892±10993 | 9675±12626 | 3332±5805 | 16641±12493 | 3135±5993 | 1911±4795 | 2578±3285 | 7480±10483 |
| *Public level- medical care cost* | | | | | | | | | | | | |
| 65-69 | 184±290 | 171±322 | 240±758 | 152±235 | 128±200 | 907±1283 | 1050±2079 | 45±83 | 86±210 | 39±71 | 67±103 | 169±498 |
| 70-74 | 152±250 | 121±293 | 489±660 | 50±110 | 346±471 | 197±232 | 320±393 | 738±2024 | 36±95 | 23±52 | 99±209 | 190±548 |
| 75-79 | 113±209 | 146±241 | 174±272 | 109±180 | 1895±6835 | 209±367 | 476±987 | 121±188 | 20±61 | 297±552 | 55±71 | 319±2132 |
| 80+ | 98±263 | 190±457 | 121±253 | 216±335 | 440±1330 | 373±542 | 514±1984 | 908±2537 | 10±33 | 14±26 | 32±62 | 247±995 |
| *Public level- social care cost* | | | | | | | | | | | | |
| 65-69 | 2994±4072 | 5101±10700 | 7108±12746 | 0 | 5140±12098 | 8589±12146 | 21208±19216 | 17937±10556 | 10899±12009 | 1058±3937 | 1871±3422 | 5210±10157 |
| 70-74 | 3894±5140 | 3711±6905 | 17861±17940 | 9633±13485 | 6356±11632 | 3972±6419 | 1586±5717 | 13249±11915 | 8587±9736 | 5330±10052 | 2351±4201 | 5295±9037 |
| 75-79 | 2917±4894 | 4079±6758 | 15685±15059 | 2897±5084 | 10399±12783 | 4393±5660 | 6148±11019 | 14283±9491 | 5889±9584 | 3572±7095 | 1128±2764 | 6173±9609 |
| 80+ | 5079±5920 | 6093±8831 | 13448±15814 | 8794±13628 | 8452±10474 | 9302±12598 | 2817±5539 | 15733±12193 | 3124±5987 | 1896±4800 | 2546±3257 | 7232±10350 |

**Table 5.8. Cost differences (in 2008 international dollars) between participants with dementia with different education levels, by site**

| Education levels | Cuba | Dominican Republic | Peru (urban) | Peru (rural) | Venezuela | Mexico (urban) | Mexico (rural) | China (urban) | China (rural) | India (urban) | India (rural) | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Private level-total cost* | | | | | | | | | | | | |
| No education | 1242±2770 | 1014±3444 | 44±73 | 529±1724 | 1279±3322 | 1062±3096 | 503±2167 | 7235±12454 | 656±1498 | 218±930 | 190±472 | 1035±4016 |
| Less than primary | 1614±4214 | 1129±2684 | 2366±5936 | 74±124 | 2306±7158 | 1756±3250 | 541±1284 | 7319±11895 | 2474±3585 | 20±36 | 83±130 | 1615±4621 |
| Completed primary | 1448±6493 | 708±2633 | 1819±4080 | 2410±5350 | 1571±3957 | 914±1917 | 657±1468 | 7236±6350 | 83±134 | 123±328 | 12±28 | 1637±5028 |
| Completed secondary and higher | 1962±4291 | 715±2270 | 5027±12402 | 0 | 24427±12402 | 214±244 | 330±592 | 11585±16537 | 1628±2768 | 104±180 | 50 | 4342±12523 |
| *Private level- medical care cost* | | | | | | | | | | | | |
| No education | 110±188 | 16±33 | 44±73 | 30±42 | 430±630 | 286±482 | 427±2117 | 4408±10930 | 228±401 | 129±732 | 32±66 | 404±2871 |
| Less than primary | 126±191 | 34±86 | 37±66 | 74±124 | 1921±6895 | 228±453 | 359±833 | 5536±12186 | 79±158 | 20±36 | 83±130 | 523±3438 |
| Completed primary | 132±251 | 19±21 | 106±404 | 25±52 | 422±942 | 254±315 | 62±138 | 2966±4464 | 42±70 | 53±130 | 12±28 | 301±1267 |
| Completed secondary and higher | 186±367 | 17±22 | 141±451 | 0 | 24427±451 | 214±244 | 144±200 | 5376±14028 | 1628±2768 | 104±180 | 50 | 1499±9772 |
| *Private level- social care cost* | | | | | | | | | | | | |
| No education | 1132±2782 | 998±3427 | 0 | 499±1728 | 849±3134 | 776±3130 | 76±502 | 2827±3277 | 429±1288 | 89±590 | 158±466 | 631±2320 |
| Less than primary | 1489±4157 | 1095±2664 | 2330±5931 | 0 | 385±1236 | 1528±3311 | 182±1044 | 1783±3061 | 2395±3456 | 0 | 0 | 1092±3133 |
| Completed primary | 1316±6480 | 689±2631 | 1712±4105 | 2385±5347 | 1149±3677 | 661±1982 | 595±1330 | 4270±4736 | 41±130 | 70±306 | 0 | 1336±4767 |
| Completed secondary and higher | 1776±4217 | 698±2268 | 4886±12429 | 0 | 0 | 0 | 186±417 | 6209±8562 | 0 | 0 | 0 | 2843±7737 |
| *Public level-total cost* | | | | | | | | | | | | |
| No education | 4785±6536 | 4331±8290 | 8843±15171 | 3195±7512 | 9506±12724 | 6731±10872 | 3000±7432 | 13106±9784 | 5614±7899 | 1021±2963 | 2205±3614 | 4622±8293 |
| Less than primary | 4440±5539 | 5914±8458 | 15642±11991 | 6521±14424 | 7660±10498 | 8060±8541 | 6002±10353 | 10375±9841 | 19182±14655 | 5297±9881 | 2497±4621 | 6391±8880 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Completed primary | 4546±5653 | 4308±8238 | 14118±15519 | 8448±11644 | 4358±9261 | 7539±13118 | 11776±17976 | 16205±10510 | 727±1235 | 3991±7958 | 1401±3398 | 6978±10710 |
| Completed secondary and higher | 4372±5349 | 7306±9532 | 14154±16378 | 15210±21510 | 2626±3861 | 14633±15323 | 7910±7854 | 21544±12934 | 6401±6016 | 16727±14542 | 76 | 10062±12614 |
| *Public level- medical care cost* | | | | | | | | | | | | |
| No education | 146±293 | 117±236 | 55±134 | 153±274 | 635±1933 | 272±382 | 541±2107 | 164±317 | 31±95 | 46±168 | 66±140 | 184±845 |
| Less than primary | 97±244 | 192±436 | 187±280 | 212±321 | 1354±5640 | 478±683 | 536±1108 | 745±1814 | 0 | 4.3±9.1 | 115±206 | 349±1902 |
| Completed primary | 113±247 | 126±319 | 124±345 | 143±226 | 415±888 | 198±194 | 187±197 | 670±2331 | 0 | 106±324 | 12±28 | 191±691 |
| Completed secondary and higher | 134±275 | 143±292 | 234±431 | 0 | 776±752 | 32±48 | 351±340 | 1026±2843 | 104±180 | 56±96 | 76 | 295±1114 |
| *Public level- social care cost* | | | | | | | | | | | | |
| No education | 4639±6436 | 4214±8311 | 8788±15049 | 3042±7564 | 8871±11626 | 6459±10818 | 2460±7254 | 12941±9771 | 5583±7869 | 974±2920 | 2138±3553 | 4438±8156 |
| Less than primary | 4343±5532 | 5721±8486 | 15455±12026 | 6309±14392 | 6307±9006 | 7582±8409 | 5466±9578 | 9630±9205 | 19182±14655 | 5292±9876 | 2382±4456 | 6042±8581 |
| Completed primary | 4433±5669 | 4183±8258 | 13994±15525 | 8305±11610 | 3943±8975 | 7341±13119 | 11588±18080 | 15535±10728 | 727±1235 | 3886±7937 | 1389±3403 | 6787±10673 |
| Completed secondary and higher | 4238±5374 | 7163±9379 | 13920±16447 | 15210±21510 | 1850±4138 | 14601±15355 | 7558±7740 | 20518±12590 | 6297±5873 | 16671±14487 | 0 | 9766±12485 |

**Table 5.9. Cost differences (in 2008 international dollars) between participants with dementia in different marital status groups, by site**

| Marital status | Cuba | Dominican Republic | Peru (urban) | Peru (rural) | Venezuela | Mexico (urban) | Mexico (rural) | China (urban) | China (rural) | India (urban) | India (rural) | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Private level-total cost* | | | | | | | | | | | | |
| Never married | 894±2448 | 451±1803 | 7932±20523 | 20±31 | 688±1445 | 2611±4204 | 1.9±3.4 | - | - | - | - | 1852±8357 |
| Married | 1537±3896 | 364±1637 | 2553±4813 | 414±1492 | 3907±18819 | 630±1572 | 407±929 | 7212±10529 | 1068±2032 | 342±1084 | 118±267 | 1925±7172 |
| Divorced/separated/widowed | 1805±5974 | 1359±3347 | 2468±5326 | 2228±5141 | 2519±6414 | 1332±3280 | 609±2137 | 10535±15354 | 560±1557 | 27±52 | 196±504 | 1804±5674 |
| *Private level- medical care cost* | | | | | | | | | | | | |
| Never married | 166±242 | 42±111 | 29±60 | 20±31 | 342±631 | 137±196 | 1.9±3.4 | - | - | - | - | 131±299 |
| Married | 147±231 | 12±16 | 143±440 | 40±67 | 3396±18774 | 297±460 | 269±702 | 3815±8826 | 455±1050 | 183±848 | 37±72 | 823±6225 |
| Divorced/separated/widowed | 134±285 | 27±63 | 110±416 | 42±101 | 1450±5307 | 256±459 | 440±1962 | 5698±13796 | 118±245 | 27±52 | 33±71 | 478±3502 |
| *Private level- social care cost* | | | | | | | | | | | | |
| Never married | 728±2366 | 408±1781 | 7903±20501 | 0 | 346±1339 | 2474±4279 | 0 | - | - | - | - | 1721±8352 |
| Married | 1390±3799 | 351±1635 | 2410±4863 | 374±1497 | 510±2230 | 333±1557 | 138±616 | 3397±4962 | 613±1747 | 159±713 | 81±260 | 1102±3237 |
| Divorced/separated/widowed | 1672±5957 | 1332±3331 | 2358±5345 | 2186±5144 | 1069±3450 | 1075±3328 | 169±912 | 4837±6892 | 442±1400 | 0 | 163±498 | 1326±4276 |
| *Public level-Total cost* | | | | | | | | | | | | |
| Never married | 3132±4422 | 6319±12206 | 17400±20370 | 1141±2866 | 5098±9773 | 11050±14421 | 15490±22432 | 15490 | 15490 | 15490 | 15490 | 6789±12346 |
| Married | 4752±5828 | 4483±7382 | 13909±14317 | 6671±10510 | 5550±10708 | 8299±10084 | 6539±11910 | 14362±11043 | 9021±9944 | 4575±8319 | 2234±3790 | 7245±10156 |
| Divorced/separated/widowed | 4696±5693 | 5480±8155 | 13300±14817 | 9893±14914 | 7077±10447 | 7038±10687 | 3383±6235 | 18038±12208 | 3886±7653 | 1610±5291 | 2128±3592 | 6058±9366 |
| *Public level- medical care cost* | | | | | | | | | | | | |
| Never married | 109±206 | 273±588 | 141±237 | 127±186 | 369±567 | 253±253 | 30±53 | 30 | 30 | 30 | 30 | 187±373 |
| Married | 130±260 | 113±228 | 195±429 | 207±324 | 578±1588 | 421±660 | 388±871 | 391±1444 | 50±129 | 101±305 | 91±204 | 230±764 |
| Divorced/separated/widowed | 109±262 | 172±395 | 163±358 | 83±181 | 973±4308 | 266±396 | 604±1996 | 996±2685 | 11±36 | 22±50 | 56±99 | 268±1501 |
| *Public level- social care cost* | | | | | | | | | | | | |
| Never married | 3024±4426 | 6046±12169 | 17259±20399 | 1014±2868 | 4729±9796 | 10798±14430 | 15460±22463 | 15460 | 15460 | 15460 | 15460 | 6602±12353 |
| Married | 4623±5844 | 4371±7382 | 13714±14377 | 6464±10634 | 4972±9601 | 7878±9980 | 6151±11392 | 13972±10680 | 8972±9911 | 4475±8288 | 2144±3662 | 7014±9966 |
| Divorced/separated/widowed | 4587±5687 | 5308±8158 | 13137±14806 | 9810±14782 | 6104±9555 | 6772±10658 | 2779±5806 | 17042±12199 | 3875±7652 | 1588±5297 | 2072±3556 | 5789±9208 |

**Table 5.10. Cost differences (in 2008 international dollars) between participants with dementia with and without income, by site**

| Having any income | Cuba | Dominican Republic | Peru (urban) | Peru (rural) | Venezuela | Mexico (urban) | Mexico (rural) | China (urban) | China (rural) | India (urban) | India (rural) | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Private level-total cost* | | | | | | | | | | | | |
| Yes | 1608±5245 | 1309±3454 | 4307±10375 | 601±2915 | 3259±14166 | 1170±2953 | 254±721 | 9022±13054 | 1106±2363 | 206±858 | 104±365 | 2237±7426 |
| No | 1563±4022 | 872±2437 | 1088±3124 | 1681±3773 | 2630±6652 | 1414±3048 | 888±2566 | 1877±2713 | 515±1116 | 136±628 | 361±576 | 1191±3671 |
| *Private level- medical care cost* | | | | | | | | | | | | |
| Yes | 144±265 | 28±68 | 72±257 | 18±35 | 2252±13965 | 282±474 | 254±721 | 4857±11432 | 390±1011 | 206±858 | 24±62 | 693±5218 |
| No | 126±256 | 22±55 | 174±556 | 78±116 | 950±4808 | 148±199 | 521±2320 | 540±476 | 156±335 | 14±37 | 62±89 | 267±2108 |
| *Private level- social care cost* | | | | | | | | | | | | |
| Yes | 1465±5215 | 1281±3432 | 4235±10384 | 584±2918 | 1007±2867 | 888±2994 | 0 | 4165±5954 | 716±2054 | 0 | 80±365 | 1543±5077 |
| No | 1437±3930 | 850±2434 | 913±3126 | 1603±3783 | 1679±4738 | 1266±3094 | 368±1218 | 1337±2990 | 359±1009 | 122±626 | 298±571 | 924±3009 |
| *Public level-total cost* | | | | | | | | | | | | |
| Yes | 4442±5598 | 5695±8379 | 17182±16620 | 3896±7663 | 7023±10310 | 6987±10344 | 3440±8299 | 15727±11578 | 7718±10081 | 2634±6475 | 1267±3114 | 6817±10213 |
| No | 4907±5602 | 5034±8349 | 8453±11997 | 12471±15995 | 9619±12836 | 11612±12237 | 7029±10835 | 18534±13260 | 4703±7921 | 3124±7271 | 4719±3871 | 6618±10044 |
| *Public level- medical care cost* | | | | | | | | | | | | |
| Yes | 116±250 | 177±403 | 170±276 | 80±200 | 626±1356 | 321±487 | 476±931 | 681±2120 | 28±80 | 103±310 | 47±99 | 243±823 |
| No | 106±279 | 159±366 | 161±494 | 302±307 | 618±3917 | 275±505 | 553±2318 | 49±74 | 26±95 | 22±49 | 126±215 | 244±1761 |
| *Public level- social care cost* | | | | | | | | | | | | |
| Yes | 4326±5606 | 5518±8345 | 17011±16647 | 3816±7697 | 6397±9735 | 6666±10290 | 2964±7606 | 15046±11304 | 7690±10063 | 2530±6422 | 1221±3078 | 6574±10068 |
| No | 4801±5568 | 4874±8380 | 8292±12008 | 12168±16046 | 9001±12406 | 11337±12195 | 6477±10829 | 18484±13279 | 4677±7897 | 3102±7267 | 4593±3762 | 6374±9922 |

**Table 5.11. Cost differences (in 2008 international dollars) between participants with dementia with different levels of household assets, by site**

| Household assets | Cuba | Dominican Republic | Peru (urban) | Peru (rural) | Venezuela | Mexico (urban) | Mexico (rural) | China (urban) | China (rural) | India (urban) | India (rural) | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Private level-total cost* | | | | | | | | | | | | |
| Bottom 50% | 1541±6339 | 603±1998 | 3025±9197 | 1817±4384 | 3003±11854 | 1007±2805 | 465±1950 | 5839±7762 | 1326±2232 | 87±540 | 102±245 | 1656±6559 |
| Top 50% | 1649±4066 | 1854±3995 | 3575±6197 | 45±90 | 2690±6917 | 1759±3320 | 642±1164 | 11354±15967 | 434±1348 | 355±1053 | 242±574 | 2210±6260 |
| *Private level- medical care cost* | | | | | | | | | | | | |
| Bottom 50% | 113±226 | 16±32 | 70±313 | 27±53 | 1596±11304 | 239±408 | 354±1810 | 2362±5224 | 358±1078 | 14±36 | 24±60 | 427±4372 |
| Top 50% | 159±285 | 39±88 | 251±588 | 45±90 | 1427±5616 | 318±533 | 390±817 | 6838±14602 | 195±348 | 294±1030 | 45±80 | 724±4515 |
| *Private level- social care cost* | | | | | | | | | | | | |
| Bottom 50% | 1428±6312 | 587±1993 | 2954±9200 | 1790±4383 | 1406±4040 | 768±2835 | 112±769 | 3477±5224 | 968±1848 | 74±538 | 78±242 | 1229±4849 |
| Top 50% | 1490±4018 | 1816±3976 | 3324±6294 | 0 | 1262±3881 | 1441±3410 | 252±874 | 4517±6434 | 239±1272 | 61±284 | 197±568 | 1487±3972 |
| *Public level-total cost* | | | | | | | | | | | | |
| Bottom 50% | 4580±5852 | 4736±7907 | 13320±14082 | 7470±11686 | 7387±10706 | 6342±10235 | 3677±7711 | 14404±12084 | 6870±6880 | 2627±6780 | 1894±3300 | 6503±9956 |
| Top 50% | 4422±5402 | 6354±8945 | 16597±20450 | 5562±11311 | 11326±14105 | 11516±11360 | 8021±12684 | 17384±11070 | 5470±10051 | 3606±7301 | 2440±3975 | 7082±10426 |
| *Public level- medical care cost* | | | | | | | | | | | | |
| Yes | 100±213 | 150±352 | 145±381 | 141±261 | 341±746 | 293±442 | 518±1849 | 667±2265 | 19±70 | 44±199 | 75±176 | 219±834 |
| No | 124±278 | 196±430 | 249±308 | 154±257 | 1413±5723 | 368±602 | 482±976 | 619±1862 | 31±98 | 88±230 | 59±96 | 277±1608 |
| *Public level- social care cost* | | | | | | | | | | | | |
| Bottom 50% | 4479±5871 | 4586±7917 | 13176±14112 | 7329±11693 | 7046±10629 | 6049±10166 | 3158±7408 | 13737±11942 | 6851±6864 | 2584±6764 | 1819±3183 | 6284±9897 |
| Top 50% | 4298±5390 | 6157±8929 | 16348±20460 | 5408±11302 | 9913±12888 | 11148±11381 | 7540±12192 | 16765±10693 | 5439±10027 | 3518±7271 | 2382±3950 | 6805±10184 |

**Table 5.12. Cost differences (in 2008 international dollars) between participants with dementia with and without memory impairment, by site**

| Memory impairment | Cuba | Dominican Republic | Peru (urban) | Peru (rural) | Venezuela | Mexico (urban) | Mexico (rural) | China (urban) | China (rural) | India (urban) | India (rural) | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Private level-total cost* | | | | | | | | | | | | |
| Yes | 1186±3663 | 918±2518 | 1911±4020 | 302±1245 | 3250±12496 | 1115±2994 | 440±1129 | 7458±8760 | 613±1699 | 274±954 | 176±406 | 1583±5871 |
| No | 1973±6688 | 805±2382 | 862±2543 | 1089±3524 | 2167±5783 | 1132±2561 | 691±2676 | 9099±16822 | 136±322 | 11±24 | 41±120 | 1381±5275 |
| *Private level- medical care cost* | | | | | | | | | | | | |
| Yes | 137±237 | 24±54 | 112±422 | 42±81 | 1914±11969 | 242±474 | 204±572 | 4399±8217 | 78±126 | 152±742 | 41±74 | 592±4955 |
| No | 130±206 | 25±68 | 88±319 | 31±65 | 1000±4290 | 298±401 | 691±2676 | 4235±12876 | 95±194 | 11±24 | 25±75 | 319±2681 |
| *Private level- social care cost* | | | | | | | | | | | | |
| Yes | 1048±3631 | 894±2518 | 1798±4044 | 260±1248 | 1336±3942 | 873±3023 | 236±987 | 3059±4808 | 535±1660 | 122±626 | 135±392 | 990±3148 |
| No | 1843±6646 | 781±2365 | 774±2548 | 1058±3510 | 1168±4059 | 834±2618 | 0 | 4865±10113 | 41±130 | 0 | 16±98 | 1062±4384 |
| *Public level-total cost* | | | | | | | | | | | | |
| Yes | 3228±4802 | 4375±7458 | 12199±14789 | 4043±10295 | 8483±11791 | 7304±10726 | 3276±5921 | 13398±11927 | 4364±8802 | 2026±5316 | 2277±3242 | 5663±9455 |
| No | 4805±5793 | 4404±6859 | 6625±12411 | 9914±12378 | 5722±9290 | 7439±10176 | 6507±12291 | 18460±11002 | 5392±10977 | 3256±7748 | 621±2192 | 5330±8608 |
| *Public level- medical care cost* | | | | | | | | | | | | |
| Yes | 116±258 | 150±351 | 207±436 | 163±240 | 759±3592 | 315±481 | 278±411 | 652±1969 | 4.7±24.7 | 87±269 | 69±98 | 267±1458 |
| No | 123±274 | 181±422 | 94±167 | 142±311 | 421±958 | 323±518 | 986±2806 | 188±389 | 15±48 | 12±35 | 42±115 | 210±807 |
| *Public level- social care cost* | | | | | | | | | | | | |
| Yes | 3112±4829 | 4224±7484 | 11992±14854 | 3880±10285 | 7724±11174 | 6990±10647 | 2998±5906 | 12746±11428 | 4360±8799 | 1938±5281 | 2208±3203 | 5395±9269 |
| No | 4682±5763 | 4223±6832 | 6531±12373 | 9771±12363 | 5301±8855 | 7116±10159 | 5521±11474 | 18272±10913 | 5377±10983 | 3244±7736 | 578±2110 | 5120±8474 |

**Table 5.13. Cost differences (in 2008 international dollars) between participants with dementia with different numbers of impaired cognitive domains (excluding memory), by site**

| Cognitive impairment | Cuba | Dominican Republic | Peru (urban) | Peru (rural) | Venezuela | Mexico (urban) | Mexico (rural) | China (urban) | China (rural) | India (urban) | India (rural) | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ***Private level- total cost*** | | | | | | | | | | | | |
| 0 | 1133±3605 | 228±529 | 1321±3858 | 59±85 | 361±450 | 2796±4721 | 21±40 | 3677±5569 | 104±285 | 185±686 | 140±392 | 564±2191 |
| 1 | 481±1510 | 574±1859 | 1342±3304 | 2.0±4.9 | 1633±4329 | 1070±3120 | 604±2495 | 8021±10644 | 87±151 | 219±991 | 76±159 | 987±3468 |
| 2 | 637±1747 | 738±2211 | 1535±4601 | 98±128 | 1118±2831 | 1107±2541 | 382±841 | 6051±10077 | 602±1360 | 27±61 | 183±420 | 1126±3674 |
| 3 | 3054±6380 | 1698±3337 | 4684±5538 | 4443±5605 | 6980±22128 | 1677±3322 | 784±1803 | 7934±7176 | 1918±2836 | 0 | 429±718 | 3694±9143 |
| 4 | 3606±8793 | 3530±6042 | 7737±20419 | 3650±7295 | 4103±6584 | 105±99 | 799±1401 | 26432±29444 | 1150±1483 | 156±221 | 1312±1668 | 4859±12060 |
| *Private level- medical care cost* | | | | | | | | | | | | |
| 0 | 61±59 | 11±10 | 30±94 | 59±85 | 258±367 | 214±260 | 21±40 | 3260±4731 | 73±173 | 39±100 | 28±60 | 191±1136 |
| 1 | 139±267 | 27±62 | 133±431 | 2.0±4.9 | 847±3577 | 258±505 | 576±2491 | 5939±10765 | 40±102 | 219±991 | 34±75 | 465±2791 |
| 2 | 156±336 | 21±63 | 36±88 | 98±128 | 530±1217 | 329±453 | 278±616 | 1298±2048 | 157±164 | 27±61 | 42±93 | 252±770 |
| 3 | 133±202 | 27±77 | 130±447 | 36±34 | 5428±21917 | 95±135 | 239±519 | 3081±5768 | 736±1258 | 0 | 49±77 | 1098±7848 |
| 4 | 151±237 | 30±47 | 238±652 | 1.5±2.9 | 201±327 | 105±99 | 204±198 | 18950±29605 | 55±76 | 156±221 | 66±94 | 985±7020 |
| *Private level- social care cost* | | | | | | | | | | | | |
| 0 | 1072±3578 | 216±527 | 1291±3867 | 0 | 102±324 | 2581±4835 | 0 | 418±1182 | 32±114 | 146±683 | 112±375 | 372±1796 |
| 1 | 342±1505 | 546±1857 | 1208±3323 | 0 | 786±2649 | 812±3141 | 28±162 | 2082±3304 | 47±123 | 0 | 41±146 | 522±2045 |
| 2 | 481±1726 | 717±2213 | 1498±4604 | 0 | 588±2079 | 778±2603 | 104±589 | 4753±9580 | 445±1407 | 0 | 141±423 | 874±3442 |
| 3 | 2921±6262 | 1671±3304 | 4554±5619 | 4407±5588 | 1552±4722 | 1582±3348 | 545±1808 | 4853±3211 | 1182±2517 | 0 | 380±722 | 2596±4719 |
| 4 | 3456±8766 | 3501±6008 | 7499±20464 | 3648±7296 | 3902±6494 | 0 | 595±1330 | 7482±4777 | 1095±1519 | 0 | 1246±1762 | 3874±9542 |
| *Public level-total cost* | | | | | | | | | | | | |
| 0 | 2387±4942 | 1185±2580 | 5991±8824 | 301±390 | 1541±3391 | 3625±4417 | 245±265 | 4891±7494 | 682±2027 | 1627±3880 | 1463±2651 | 2048±4523 |
| 1 | 1427±2621 | 2293±4485 | 7614±13276 | 1757±6176 | 3497±6868 | 3721±6317 | 2760±8703 | 11752±10969 | 4248±9629 | 1296±5012 | 1652±3063 | 3036±6764 |
| 2 | 2972±4721 | 3757±7054 | 10629±15716 | 9688±17223 | 6721±9763 | 8497±9672 | 5037±9426 | 15523±12665 | 3350±6086 | 3082±8093 | 2657±3855 | 5924±9692 |
| 3 | 7357±6270 | 9391±9061 | 20721±15659 | 17902±10570 | 14466±15018 | 19340± 15186 | 6487±7473 | 20107±9208 | 11217± 10818 | 11710±12879 | 4267±4664 | 12830± 12130 |
| 4 | 9933±4950 | 16890± 11040 | 25565±13902 | 19824±10371 | 16900±12817 | 20997± 29695 | 20680± 11543 | 24028±10979 | 13976± 4157 | 18541± 11064 | 14828± 2607 | 15498± 10941 |
| *Public level- medical care cost* | | | | | | | | | | | | |
| 0 | 50±99 | 147±340 | 110±197 | 301±390 | 50±99 | 190±212 | 245±265 | 114±173 | 12±42 | 73±240 | 53±88 | 92±209 |
| 1 | 117±253 | 194±461 | 251±558 | 41±127 | 336±777 | 285±420 | 782±2519 | 1120±2679 | 0 | 56±221 | 52±84 | 256±971 |
| 2 | 125±228 | 122±224 | 129±225 | 224±197 | 517±1000 | 387±607 | 420±845 | 118±314 | 7.6±24.0 | 20±21 | 66±151 | 210±502 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | 112±278 | 205±461 | 173±390 | 157±268 | 1830±6508 | 216±380 | 241±351 | 882±2742 | 76±154 | 0 | 99±145 | 431±2455 |
| 4 | 114±291 | 135±253 | 141±247 | 27±54 | 156±293 | 384±543 | 159±204 | 649±808 | 26±58 | 83±118 | 538±761 | 156±332 |
| *Public level- social care cost* | | | | | | | | | | | | |
| 0 | 2336±4950 | 1038±2500 | 5881±8830 | 0 | 1490±3414 | 3436±4208 | 0 | 4777±7333 | 671±2022 | 1555±3828 | 1410±2626 | 1956±4496 |
| 1 | 1310±2598 | 2098±4511 | 7362±13378 | 1716±6187 | 3161±6506 | 3436±6312 | 1978±7732 | 10632±9667 | 4248±9629 | 1240±4960 | 1600±3019 | 2780±6516 |
| 2 | 2847±4705 | 3635±7043 | 10500±15664 | 9464±17192 | 6204±9703 | 8110±9588 | 4616±9126 | 15405±12659 | 3342±6091 | 3062±8102 | 2592±3771 | 5715±9626 |
| 3 | 7245±6318 | 9186±9049 | 20548±15742 | 17745±10391 | 12636±13929 | 19124± 15167 | 6246±7577 | 19225±9519 | 11141± 10786 | 11710± 12879 | 4168±4590 | 12400± 11956 |
| 4 | 9819±4941 | 16754± 11004 | 25424±13770 | 19797±10411 | 16744±12796 | 20613± 29152 | 20521± 11623 | 23380±10554 | 13950± 4186 | 18458± 10946 | 14290± 3368 | 15343± 10867 |

**Table 5.14. Cost differences (in 2008 international dollars) among participants with dementia with different BPSD severity scores, by site**

| BPSD severity score | Cuba | Dominican Republic | Peru (urban) | Peru (rural) | Venezuela | Mexico (urban) | Mexico (rural) | China (urban) | China (rural) | India (urban) | India (rural) | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Private level-total cost* | | | | | | | | | | | | |
| 0 | 972±2650 | 160±532 | 1759±4450 | 40±79 | 482±985 | 287±633 | 1038±3149 | 8701±13332 | 260±819 | 175±819 | 13±49 | 1950±6565 |
| 1-4 | 762±2264 | 752±2002 | 2553±4660 | 16±38 | 2290±6115 | 900±2251 | 190±664 | 5683±5924 | 879±1894 | 223±881 | 270±560 | 1215±3387 |
| 5+ | 2297±6532 | 1284±3346 | 3864±11024 | 2540±5020 | 4193±14533 | 1665±3620 | 547±1309 | 12897±17239 | 2084±3024 | 67±145 | 229±498 | 2308±7781 |
| *Private level- medical care cost* | | | | | | | | | | | | |
| 0 | 148±340 | 24±59 | 7.1±19.7 | 40±79 | 164±204 | 287±633 | 843±3107 | 5360±12364 | 91±156 | 4.9±9.1 | 13±49 | 1060±5541 |
| 1-4 | 121±297 | 23±72 | 115±452 | 16±38 | 834±4021 | 266±419 | 89±291 | 2024±3769 | 289±506 | 181±857 | 21±48 | 280±1582 |
| 5+ | 151±217 | 26±59 | 128±394 | 61±99 | 2615±14099 | 249±407 | 359±854 | 6106±14009 | 226±400 | 67±145 | 59±92 | 521±5151 |
| *Private level- social care cost* | | | | | | | | | | | | |
| 0 | 824±2632 | 136±528 | 1752±4454 | 0 | 318±878 | 0 | 195±686 | 3341±4821 | 169±812 | 170±816 | 0 | 889±2775 |
| 1-4 | 641±2241 | 729±2003 | 2438±4697 | 0 | 1456±4864 | 634±2279 | 101±580 | 3659±3852 | 589±1660 | 42±236 | 249±543 | 934±2893 |
| 5+ | 2146±6486 | 1259±3328 | 3736±11040 | 2478±5037 | 1578±4110 | 1416±3689 | 187±1060 | 6791±9700 | 1858±2821 | 0 | 169±504 | 1787±5747 |
| *Public level-total cost* | | | | | | | | | | | | |
| 0 | 2962±4462 | 5420±10507 | 7482±10719 | 178±354 | 2152±3702 | 2515±3323 | 2906±5751 | 15104±11205 | 1897±4302 | 1209±3148 | 578±1859 | 4714±8271 |
| 1-4 | 3384±5299 | 4612±8271 | 12786±14938 | 1729±5929 | 6251±10762 | 6165±11085 | 5171±11134 | 13361±11320 | 7556±7877 | 427±1599 | 2142±3348 | 5479±9598 |
| 5+ | 5627±5833 | 5580±8239 | 16149±16732 | 14527±14652 | 11791±12968 | 10192±11242 | 4297±7088 | 22006±12340 | 18696±13559 | 8194±10775 | 3500±4406 | 8251±10852 |
| *Public level- medical care cost* | | | | | | | | | | | | |
| 0 | 167±299 | 105±262 | 80±176 | 178±354 | 136±283 | 269±383 | 954±3084 | 587±1770 | 7.6±30.6 | 70±296 | 19±50 | 249±1151 |
| 1-4 | 98±211 | 196±459 | 208±528 | 135±271 | 316±834 | 314±476 | 382±897 | 654±2175 | 48±131 | 55±192 | 38±57 | 200±678 |
| 5+ | 112±266 | 166±373 | 160±252 | 167±208 | 1012±4224 | 325±527 | 378±797 | 845±2837 | 12±33 | 46±78 | 122±204 | 271±1500 |
| *Public level- social care cost* | | | | | | | | | | | | |
| 0 | 2795±4460 | 5314±10341 | 7402±10771 | 0 | 2016±3729 | 2246±3243 | 1952±5075 | 14517±10782 | 1889±4303 | 1139±3057 | 558±1864 | 4465±8040 |
| 1-4 | 3286±5309 | 4415±8330 | 12578±15021 | 1594±5962 | 5936±10641 | 5851±10994 | 4789±10613 | 12708±11210 | 7508±7822 | 372±1464 | 2104±3334 | 5279±9511 |
| 5+ | 5515±5829 | 5414±8234 | 15989±16715 | 14360±14642 | 10778±12368 | 9867±11225 | 3919±6749 | 21160±12479 | 18683±13565 | 8148±10771 | 3379±4301 | 7979±10716 |

**Table 5.15. Cost differences (in 2008 international dollars) between participants with different levels of dementia, by site**

| Severity of dementia | Cuba | Dominican Republic | Peru (urban) | Peru (rural) | Venezuela | Mexico (urban) | Mexico (rural) | China (urban) | China (rural) | India (urban) | India (rural) | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Private level-total cost* | | | | | | | | | | | | |
| Questionable and mild | 658±1992 | 499±1662 | 1702±3907 | 610±2323 | 2597±11818 | 1056±2885 | 494±1807 | 5475±7440 | 216±697 | 173±756 | 110±302 | 1080±4711 |
| Moderate and severe | 3096±7534 | 2770±4804 | 5866±13310 | 2922±6524 | 3741±7488 | 2071±3289 | 735±1190 | 14215±17768 | 2427±2782 | 62±140 | 1052±995 | 4188±9454 |
| *Private level- medical care cost* | | | | | | | | | | | | |
| Questionable and mild | 129±228 | 23±59 | 83±340 | 41±78 | 1748±11470 | 254±450 | 364±1654 | 3076±6958 | 85±143 | 98±584 | 30±68 | 439±4088 |
| Moderate and severe | 159±312 | 30±70 | 159±479 | 3.5±5.2 | 1054±5359 | 292±418 | 364±598 | 7344±15936 | 770±1300 | 62±140 | 94±93 | 870±5285 |
| *Private level- social care cost* | | | | | | | | | | | | |
| Questionable and mild | 529±1981 | 476±1659 | 1619±3923 | 569±2319 | 849±3156 | 802±2916 | 130±773 | 2400±3425 | 130±689 | 75±492 | 80±288 | 641±2314 |
| Moderate and severe | 2937±7479 | 2740±4776 | 5708±13346 | 2918±6526 | 2687±5391 | 1778±3414 | 372±1051 | 6872±7947 | 1657±2578 | 0 | 958±1077 | 3318±7588 |
| *Public level-total cost* | | | | | | | | | | | | |
| Questionable and mild | 1962±3556 | 2593±5030 | 9667±13965 | 4994±10630 | 5096±9321 | 6661±9647 | 3838±8526 | 11740±9730 | 2635±6491 | 2253±5934 | 1622±2960 | 4164±8127 |
| Moderate and severe | 8558±5852 | 13125±10630 | 22260±15454 | 15951±12477 | 16850±13167 | 13785±14525 | 15659±12760 | 23371±11095 | 16076±7758 | 12180±12604 | 9961±3788 | 14126±11644 |
| *Public level- medical care cost* | | | | | | | | | | | | |
| Questionable and mild | 112±235 | 162±384 | 186±429 | 153±266 | 440±1182 | 284±429 | 533±1716 | 289±989 | 5.4±25.9 | 58±214 | 54±97 | 203±715 |
| Moderate and severe | 119±282 | 187±390 | 132±208 | 113±199 | 1083±5354 | 476±738 | 257±414 | 1281±3117 | 91±158 | 33±75 | 265±390 | 358±2064 |
| *Public level- social care cost* | | | | | | | | | | | | |
| Questionable and mild | 1850±3562 | 2431±5038 | 9481±14030 | 4841±10599 | 4655±8824 | 6376±9598 | 3305±8023 | 11451±9613 | 2630±6493 | 2194±5910 | 1568±2916 | 3962±8005 |
| Moderate and severe | 8439±5856 | 12938±10628 | 22128±15373 | 15838±12636 | 15768±12941 | 13308±14550 | 15402±12945 | 22091±11213 | 15985±7773 | 12146±12557 | 9697±3730 | 13768±11523 |

**Table 5.16. Cost differences (in 2008 international dollars) between participants with different subtypes of dementia, by site**

| Subtypes of dementia | Cuba | Dominican Republic | Peru (urban) | Peru (rural) | Venezuela | Mexico (urban) | Mexico (rural) | China (urban) | China (rural | India (urban) | India (rural) | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Private level-total cost* | | | | | | | | | | | | |
| Not allocated | 467±2195 | 312±1368 | 369±1136 | 360±1409 | 1141±2653 | 487±1377 | 392±1938 | 3982±5188 | 381±1040 | 100±523 | 142±447 | 555±2045 |
| Pure AD | 1516±3369 | 1126±2937 | 5229±12677 | 1487±4605 | 1874±5863 | 1044±2565 | 1292±1913 | 10873±13718 | 246±542 | 656±1540 | 336±245 | 2364±6771 |
| Pure VD | 2336±4154 | 1453±3029 | 3435±5154 | 89±174 | 1993±5162 | 1210±2720 | 308±319 | 10886±15802 | 2351±2907 | 84±112 | 290±325 | 3243±7776 |
| Mixed AD/VAD | 1036±1940 | 2976±6628 | 0 | 0 | 3918±5541 | 0 | 0 | - | 4640±4594 | 0 | 469 | 1744±4324 |
| Pure DLB | 1762±3918 | 1224±2964 | 3897±5614 | 3937±6734 | 378±300 | 304 | 0 | - | - | 5.5±7.7 | 60±83 | 1474±3431 |
| Mixed AD/DLB | 7938±18688 | 1528±3244 | 5263±7452 | 5263 | 24767±7452 | 1241±2640 | 424±686 | 5254 | 5254 | 0 | 813±1115 | 5566±16731 |
| FTD | 3579±10258 | 301±639 | 1087±3526 | 1087 | 4884±7986 | 4863±6119 | 0 | 4003±5492 | 360 | 20 | 162±179 | 2460±5954 |
| *Private level- medical care cost* | | | | | | | | | | | | |
| Not allocated | 147±291 | 26±69 | 163±492 | 27±50 | 358±956 | 258±389 | 392±1938 | 1998±3290 | 68±147 | 31±84 | 26±60 | 229±1068 |
| Pure AD | 119±249 | 15±26 | 106±390 | 28±66 | 1029±4920 | 256±474 | 410±968 | 4374±10470 | 91±115 | 523±1530 | 87±90 | 486±3194 |
| Pure VD | 167±245 | 20±28 | 20±45 | 89±174 | 1492±5051 | 466±630 | 308±319 | 7283±15215 | 1094±1629 | 84±112 | 76±132 | 1434±6665 |
| Mixed AD/VAD | 92±131 | 71±132 | 0 | 0 | 332±469 | 0 | 0 | - | 876±730 | 0 | 42 | 109±248 |
| Pure DLB | 260±369 | 8.9±18.3 | 7.6±10.8 | 56±34 | 378±300 | 304 | 0 | - | - | 5.5±7.7 | 13±9 | 111±232 |
| Mixed AD/DLB | 261±343 | 21±28 | 308±790 | 308 | 16602±790 | 51±70 | 424±686 | 0 | - | 0 | 12±18 | 1950±14295 |
| FTD | 162±195 | 58±144 | 65±93 | 65 | 75±128 | 126±316 | 0 | 660±764 | 360 | 20 | 162±179 | 116±227 |
| *Private level- social care cost* | | | | | | | | | | | | |
| Not allocated | 320±2082 | 286±1363 | 206±1058 | 333±1411 | 783±2469 | 228±1351 | 0 | 1985±3543 | 313±1038 | 69±518 | 116±439 | 327±1589 |
| Pure AD | 1398±3349 | 1111±2937 | 5123±12694 | 1459±4614 | 846±2898 | 788±2592 | 882±1794 | 6499±8896 | 155±557 | 134±422 | 249±276 | 1877±5788 |
| Pure VD | 2169±4036 | 1433±3025 | 3415±5154 | 0 | 501±1461 | 744±2784 | 0 | 3603±3421 | 1258±2395 | 0 | 214±370 | 1808±3413 |
| Mixed AD/VAD | 943±1958 | 2905±6549 | 0 | 0 | 3587±5072 | 0 | 0 | - | 3764±5323 | 0 | 427 | 1634±4259 |
| Pure DLB | 1502±3893 | 1215±2962 | 3890±5621 | 3880±6721 | 0 | 0 | 0 | - | - | 0 | 48±82 | 1363±3438 |
| Mixed AD/DLB | 7677±18679 | 1507±3231 | 4955±7623 | 4955 | 8166±9212 | 1189±2660 | 0 | 5254 | 5254 | 0 | 801±1132 | 3616±9388 |
| FTD | 3417±10251 | 244±627 | 1022±3540 | 1022 | 4809±8035 | 4737±6211 | 0 | 3343±4728 | 0 | 0 | 0 | 2344±5955 |
| *Public level-total cost* | | | | | | | | | | | | |
| Not allocated | 1795±3874 | 1877±5126 | 6813±11683 | 2288±6422 | 4336±8285 | 5106±8430 | 2609±7587 | 10517±10409 | 2524±5124 | 819±3019 | 1503±3170 | 2939±6719 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Pure AD | 4672±5175 | 5710±8891 | 15730±16298 | 7660±11675 | 9225±11671 | 8177±12689 | 3448±5129 | 15978±11177 | 4366±6248 | 10154±10166 | 5431±2932 | 7693±10420 |
| Pure VD | 7452±6764 | 8762±9547 | 20771±13112 | 18369±18797 | 10547±14835 | 10408±9806 | 18609±13325 | 19956±11431 | 17007±10898 | 10729±15140 | 8099±826 | 12555±11907 |
| Mixed AD/VAD | 7950±6962 | 7942±9577 | 3380±5854 | 14196 | 9796±13738 | 20671±29070 | 8038±11367 | 8038 | 25544±9087 | 11908±16841 | 7252 | 9408±10232 |
| Pure DLB | 4682±5628 | 2582±4475 | 24068±11087 | 9706±16665 | 5559±10274 | 17199 | 9448±13361 | 9448 | 9448 | 20±28 | 852±1369 | 6407±9798 |
| Mixed AD/DLB | 10632±4881 | 7891±9039 | 22350±20735 | 22350 | 19127±14887 | 4976±8201 | 13935±15473 | 11066 | 11066 | 25007 | 3620±4985 | 11738±12313 |
| FTD | 3284±6407 | 3651±8288 | 10306±17913 | 10306 | 12174±10950 | 10064±9877 | 2810±3315 | 21508±18905 | 0 | 46 | 8106±7068 | 7907±11719 |
| *Public level- medical care cost* | | | | | | | | | | | | |
| Not allocated | 106±273 | 189±478 | 165±440 | 148±257 | 258±489 | 297±431 | 669±2052 | 118±220 | 8.8±32.8 | 25±52 | 48±83 | 181±733 |
| Pure AD | 129±266 | 119±289 | 129±207 | 147±312 | 857±4869 | 288±351 | 272±438 | 933±2897 | 6.9±30.0 | 271±528 | 72±73 | 274±1836 |
| Pure VD | 100±239 | 162±301 | 130±203 | 116±169 | 904±2059 | 561±810 | 286±305 | 895±2144 | 114±194 | 12±16 | 160±247 | 381±1183 |
| Mixed AD/VAD | 79±107 | 172±304 | 0 | 0 | 41±58 | 58±82 | 308±435 | 308 | 114±161 | 0 | 108 | 110±210 |
| Pure DLB | 54±79 | 366±676 | 118±119 | 242±272 | 932±1278 | 21 | 0 | - | - | 20±28 | 58±38 | 289±644 |
| Mixed AD/DLB | 156±285 | 109±208 | 383±845 | 383 | 706±996 | 7.5±16.8 | 193±464 | 0 | - | 0 | 47±67 | 208±499 |
| FTD | 67±143 | 141±304 | 327±530 | 327 | 244±382 | 330±529 | 233±329 | 0 | 0 | 46 | 564±540 | 228±401 |
| *Public level- social care cost* | | | | | | | | | | | | |
| Not allocated | 1689±3870 | 1688±5141 | 6648±11735 | 2141±6468 | 4078±8166 | 4810±8382 | 1940±6658 | 10399±10358 | 2515±5126 | 794±3005 | 1455±3147 | 2759±6599 |
| Pure AD | 4543±5171 | 5591±8877 | 15601±16226 | 7513±11767 | 8368±10987 | 7889±12652 | 3176±5142 | 15045±11142 | 4360±6241 | 9884±10244 | 5359±2892 | 7420±10269 |
| Pure VD | 7352±6777 | 8600±9560 | 20640±13128 | 18252±18661 | 9642±13779 | 9846±9535 | 18323±13291 | 19061±11075 | 16893±10928 | 10717±15157 | 7939±688 | 12174±11641 |
| Mixed AD/VAD | 7872±7016 | 7770±9558 | 3380±5854 | 14196 | 9755±13796 | 20613±29152 | 7730±10932 | 7730 | 25430±9248 | 11908±16841 | 7145 | 9298±10240 |
| Pure DLB | 4627±5596 | 2215±4058 | 23950±11176 | 9464±16392 | 4626±10595 | 17178 | 9448±13361 | 9448 | 9448 | 0 | 794±1375 | 6118±9801 |
| Mixed AD/DLB | 10476±4919 | 7782±9044 | 21967±21080 | 21967 | 18420±15292 | 4969±8200 | 13742±15669 | 11066 | 11066 | 25007 | 3572±5052 | 11530±12371 |
| FTD | 3217±6444 | 3510±8278 | 9979±18046 | 9979 | 11929±11036 | 9734±10053 | 2577±3644 | 21508±18905 | 0 | 0 | 7542±6558 | 7679±11764 |

**Table 5.17. Cost differences (in 2008 international dollars) between participants with different numbers of physical impairments, by site**

| Different number of impairments | Cuba | Dominican Republic | Peru (urban) | Peru (rural) | Venezuela | Mexico (urban) | Mexico (rural) | China (urban) | China (rural) | India (urban) | India (rural) | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Private level-total cost* | | | | | | | | | | | | |
| 0 | 1525±6212 | 608±2320 | 3207±5581 | 16±29 | 2090±4800 | 555±1453 | 823±1656 | 3718±3474 | 201±617 | 146±717 | 300±716 | 1375±4404 |
| 1-2 | 1371±3521 | 1002±2550 | 3713±12546 | 1346±4066 | 1887±6243 | 1730±3750 | 532±2199 | 6243±8326 | 555±1171 | 216±800 | 99±243 | 1622±5256 |
| 3+ | 2742±6476 | 1625±3901 | 2173±4874 | 1073±2415 | 5103±17841 | 1054±2565 | 278±695 | 15304±18672 | 4007±3862 | 45±36 | 222±510 | 3118±9871 |
| *Private level- medical care cost* | | | | | | | | | | | | |
| 0 | 88±160 | 11±17 | 188±573 | 16±29 | 123±229 | 270±506 | 325±778 | 1024±2287 | 14±39 | 119±695 | 10±18 | 143±587 |
| 1-2 | 168±323 | 25±69 | 57±224 | 35±89 | 1076±5102 | 243±355 | 510±2195 | 2393±4402 | 314±846 | 53±120 | 22±60 | 371±1985 |
| 3+ | 182±218 | 36±72 | 57±111 | 75±65 | 3944±17723 | 279±522 | 150±217 | 10312±18050 | 571±534 | 45±36 | 64±90 | 1470±8734 |
| *Private level- social care cost* | | | | | | | | | | | | |
| 0 | 1437±6196 | 598±2319 | 3020±5645 | 0 | 1967±4833 | 286±1416 | 498±1540 | 2693±3221 | 187±620 | 27±191 | 289±717 | 1232±4379 |
| 1-2 | 1203±3466 | 977±2549 | 3656±12543 | 1312±4066 | 811±3337 | 1487±3826 | 22±142 | 3850±6769 | 241±889 | 163±799 | 77±240 | 1251±4752 |
| 3+ | 2560±6410 | 1588±3871 | 2116±4882 | 998±2444 | 1158±3285 | 775±2582 | 128±653 | 4992±5355 | 3436±3546 | 0 | 158±496 | 1649±4149 |
| *Public level-total cost* | | | | | | | | | | | | |
| 0 | 3952±5284 | 3740±7649 | 13390±16540 | 3180±7185 | 10220±12171 | 8540±11372 | 6956±11457 | 13842±11924 | 1162±2917 | 3836±8060 | 2113±4528 | 6409±10393 |
| 1-2 | 4242±5464 | 5317±8651 | 12771±14394 | 7530±13404 | 5868±11189 | 9067±11908 | 3494±8339 | 14251±11378 | 6740±9218 | 1273±3512 | 1712±3061 | 6060±9564 |
| 3+ | 7221±6304 | 6778±8350 | 16995±16028 | 8697±9907 | 8702±11610 | 4316±6530 | 5886±9972 | 19796±11303 | 15130±11466 | 45±0 | 2853±3998 | 8579±10738 |
| *Public level- medical care cost* | | | | | | | | | | | | |
| 0 | 81±194 | 79±241 | 192±515 | 138±206 | 104±246 | 196±330 | 492±1024 | 25±67 | 0 | 69±255 | 29±40 | 114±348 |
| 1-2 | 140±296 | 154±347 | 168±246 | 123±254 | 1003±5105 | 286±491 | 658±2228 | 377±1524 | 39±107 | 33±48 | 45±94 | 250±1573 |
| 3+ | 107±219 | 259±496 | 124±188 | 247±348 | 910±1743 | 507±593 | 270±328 | 1439±3031 | 17±39 | 45±0 | 117±205 | 408±1184 |
| *Public level- social care cost* | | | | | | | | | | | | |
| 0 | 3871±5282 | 3662±7658 | 13198±16615 | 3042±7234 | 10116±12211 | 8344±11411 | 6464±11209 | 13817±11950 | 1162±2917 | 3767±8034 | 2084±4529 | 6295±10393 |
| 1-2 | 4102±5455 | 5163±8659 | 12603±14384 | 7407±13351 | 4865±10060 | 8782±11828 | 2836±7552 | 13874±10986 | 6701±9192 | 1240±3520 | 1667±3020 | 5810±9376 |
| 3+ | 7114±6350 | 6518±8349 | 16872±15983 | 8450±10133 | 7792±10750 | 3809±6236 | 5616±10011 | 18356±11481 | 15113±11470 | 0 | 2736±3878 | 8170±10531 |

- Participants with depression have higher cost for medical care than those without depression (Table 5.18).
- The number of types of ADL (Table 5.19) and IADL (Table 5.20) help needed is related to the cost of social care especially at public level.
- Supervision is only related to the cost of social care (Table 5.21).

**Cost predictors**

*Private level medical care cost model*

Results from the bootstrapped linear regression model for private level medical care costs are shown in Table 5.22. Participants in urban China have significantly higher costs (on average by I$3864) compared to participants from Cuba (the reference category). Costs are significantly associated with the number of physical impairments (each additional impairment adding I$335 to cost). Participants living with children, having male carers or non-relative carers, or suffering with COPD had reduced costs of medical care than otherwise. This model could explain 11% of cost variation.

*Public level medical care cost model*

In this model participants living in Venezuela, rural Mexico, or urban China have significantly higher medical care costs than people living in Cuba (Table 5.23). Participants with married carers have higher cost than those in other marital situations. If the participant had had a stroke then their cost was on average I$167 more than otherwise. If the main carer was male carers or a non-relative then this had a negative association with the cost. This model could only explain 6% of cost variation.

*Private level informal care cost model*

Private level informal care costs are significantly higher for participants living with other people or who have carers who are in paid employment (Table 5.24). Participants with more severe cognitive impairment or BPSD also have significantly higher costs. Participants with dementia living in the Dominican Republic, urban Peru, and rural Mexico have significantly lower costs than those living in Cuba. The amount of variation in these informal care costs explained by the model was 13%.

**Table 5.18. Cost differences (in 2008 international dollars) between participants with dementia with and without depression, by site**

| Having depression | Cuba | Dominican Republic | Peru (urban) | Peru (rural) | Venezuela | Mexico (urban) | Mexico (rural) | China (urban) | China (rural) | India (urban) | India (rural) | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Private level-total cost* | | | | | | | | | | | | |
| Yes | 2843±5897 | 1037±2516 | 267±670 | 1075±2417 | 8112±24571 | 888±1850 | 495±1160 | 5254 | 1778±3133 | 50±63 | 99±171 | 2059±9511 |
| No | 1493±4987 | 1119±3154 | 3409±8965 | 902±3352 | 1942±4678 | 1248±3065 | 519±1817 | 8637±12855 | 647±1538 | 182±778 | 184±475 | 1862±5863 |
| *Private level- medical care cost* | | | | | | | | | | | | |
| Yes | 193±272 | 21±31 | 267±670 | 77±137 | 7056±24492 | 293±505 | 495±1160 | 0 | 90±144 | 50±63 | 53±98 | 1036±9027 |
| No | 136±263 | 26±69 | 95±358 | 28±54 | 514±2385 | 256±439 | 349±1632 | 4655±11186 | 276±748 | 102±602 | 31±65 | 480±3267 |
| *Private level- social care cost* | | | | | | | | | | | | |
| Yes | 2650±5791 | 1015±2517 | 0 | 998±2444 | 1055±3139 | 595±1881 | 0 | 5254 | 1688±3012 | 0 | 46±157 | 1024±3084 |
| No | 1356±4958 | 1093±3136 | 3314±8978 | 874±3350 | 1428±4134 | 992±3109 | 170±841 | 3982±5882 | 371±1243 | 80±507 | 153±468 | 1382±4671 |
| *Public level-total cost* | | | | | | | | | | | | |
| Yes | 5450±6526 | 4965±7219 | 9720±9835 | 14960±17841 | 10334±13664 | 5971±8169 | 4483±8274 | 13972 | 20102±13860 | 9722±11648 | 2979±3654 | 7039±9756 |
| No | 4432±5509 | 5505±8688 | 14424±16042 | 4827±9144 | 8058±11405 | 7946±11026 | 4976±9720 | 15917±11683 | 4302±6561 | 1986±5499 | 2010±3637 | 6709±10214 |
| *Public level- medical care cost* | | | | | | | | | | | | |
| Yes | 111±165 | 149±300 | 501±704 | 88±139 | 1978±7112 | 395±631 | 284±394 | 0 | 0 | 63±92 | 107±154 | 410±2622 |
| No | 115±261 | 174±408 | 136±308 | 160±273 | 366±1074 | 304±471 | 533±1727 | 651±2072 | 30±93 | 56±219 | 60±139 | 219±839 |
| *Public level- social care cost* | | | | | | | | | | | | |
| Yes | 5339±6555 | 4816±7224 | 9218±9950 | 14872±17757 | 8356±12424 | 5576±8008 | 4199±8376 | 13972 | 20102±13860 | 9659±11674 | 2872±3574 | 6629±9488 |
| No | 4318±5507 | 5331±8682 | 14288±16048 | 4668±9158 | 7692±11114 | 7642±10984 | 4443±9325 | 15266±11437 | 4272±6521 | 1931±5462 | 1950±3575 | 6490±10095 |

**Table 5.19. Cost differences (in 2008 international dollars) among participants with dementia who received different level of ADL care, by site**

| Number of ADL care needed | Cuba | Dominican Republic | Peru (urban) | Peru (rural) | Venezuela | Mexico (urban) | Mexico (rural) | China (urban) | China (rural) | India (urban) | India (rural) | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Private level-total cost* | | | | | | | | | | | | |
| 0 | 212±724 | 143±929 | 245±908 | 32±58 | 2468±12019 | 630±2313 | 392±1826 | 4207±6295 | 62±107 | 128±635 | 16±38 | 595±4584 |
| 1-3 | 1804±2497 | 2086±3419 | 4389±6123 | 0 | 2171±3650 | 556±628 | 1310±2107 | 10178±13648 | 1092±2245 | 25±32 | 265±232 | 2681±5808 |
| 4-5 | 3664±8019 | 2860±4661 | 5918±12287 | 3272±5570 | 7728±9119 | 4073±4629 | 563±1066 | 9886±14248 | 1875±2421 | 477±1300 | 631±764 | 4304±8937 |
| *Private level- medical care cost* | | | | | | | | | | | | |
| 0 | 113±214 | 23±63 | 141±457 | 32±58 | 1728±11676 | 248±444 | 392±1826 | 3023±4651 | 62±107 | 107±615 | 16±38 | 392±4297 |
| 1-3 | 197±472 | 23±28 | 5.7±13.4 | 0 | 600±1289 | 449±547 | 170±307 | 5909±13045 | 134±207 | 25±32 | 60±83 | 782±4387 |
| 4-5 | 164±227 | 29±70 | 108±379 | 50±109 | 2077±6772 | 104±214 | 365±755 | 4773±12379 | 730±1262 | 42±102 | 85±114 | 782±4728 |
| *Private level- social care cost* | | | | | | | | | | | | |
| 0 | 100±700 | 120±925 | 104±798 | 0 | 740±3025 | 382±2311 | 0 | 1184±2329 | 0 | 21±168 | 0 | 202±1430 |
| 1-3 | 1608±2541 | 2063±3419 | 4383±6121 | 0 | 1571±3281 | 108±338 | 1140±2128 | 4269±3834 | 958±2176 | 0 | 205±250 | 1899±3436 |
| 4-5 | 3500±7964 | 2831±4630 | 5811±12310 | 3222±5582 | 5650±7679 | 3969±4704 | 198±768 | 5113±7101 | 1145±2109 | 435±1305 | 546±790 | 3522±7498 |
| *Public level-total cost* | | | | | | | | | | | | |
| 0 | 461±1968 | 343±1218 | 604±1846 | 169±282 | 3514±7145 | 2643±5755 | 452±1767 | 4162±7930 | 2.6±14.1 | 265±1181 | 34±52 | 1007±3680 |
| 1-3 | 5778±3941 | 10722±8457 | 14310±10373 | 6084 | 17720±12195 | 15228±12055 | 8757±4500 | 13978±7445 | 7168±8658 | 9670±6222 | 4292±1146 | 11122±9463 |
| 4-5 | 10300±4433 | 14577±8506 | 28602±11923 | 22427±10480 | 26924±9565 | 18858±11064 | 21411±11951 | 21745±10183 | 16642±7672 | 19209±7001 | 8191±2600 | 17090±10789 |
| *Public level- medical care cost* | | | | | | | | | | | | |
| 0 | 116±246 | 167±397 | 225±503 | 169±282 | 584±3382 | 282±421 | 452±1767 | 593±2219 | 2.6±14.1 | 38±142 | 34±52 | 226±1379 |
| 1-3 | 96±210 | 180±338 | 80±125 | 0 | 741±1949 | 576±746 | 359±374 | 283±463 | 24±55 | 540±772 | 124±133 | 284±848 |
| 4-5 | 119±281 | 166±384 | 132±201 | 109±193 | 673±1408 | 151±239 | 829±1576 | 806±2365 | 76±154 | 24±55 | 153±258 | 260±980 |
| *Public level- social care cost* | | | | | | | | | | | | |
| 0 | 345±1954 | 176±1150 | 379±1749 | 0 | 2930±6323 | 2361±5665 | 0 | 3569±7379 | 0 | 227±1088 | 0 | 781±3347 |
| 1-3 | 5682±3950 | 10542±8481 | 14230±10324 | 6084 | 16979±11552 | 14652±12088 | 8398±4332 | 13695±7448 | 7145±8663 | 9130±6558 | 4168±1102 | 10838±9263 |
| 4-5 | 10181±4448 | 14411±8507 | 28470±11898 | 22318±10389 | 26250±9825 | 18707±10998 | 20583±11386 | 20939±9987 | 16566±7686 | 19185±6980 | 8038±2489 | 16830±10682 |

**Table 5.20. Cost differences (in 2008 international dollars) between participants with dementia who received different level of IADL care, by site**

| Number of IADL care needed | Cuba | Dominican Republic | Peru (urban) | Peru (rural) | Venezuela | Mexico (urban) | Mexico (rural) | China (urban) | China (rural) | India (urban) | India (rural) | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Private level-total cost* | | | | | | | | | | | | |
| 0 | 759±5003 | 552±2394 | 1057±3240 | 31±56 | 2152±11784 | 874±2288 | 442±1826 | 6183±7718 | 327±977 | 31±83 | 15±37 | 977±5208 |
| 1 | 2555±4855 | 2651±3939 | 3429±4790 | 5331±7214 | 5350±9079 | 1406±2775 | 946±1417 | 12203±16752 | 2172±2874 | 6.0±10.6 | 534±655 | 3585±7787 |
| 2 | 3742±5435 | 2393±4079 | 6172±13064 | 2000±3465 | 3544±5689 | 1955±4479 | 642±347 | 1180±1417 | 696±984 | 1748±2135 | 845±986 | 3861±8679 |
| *Private level- medical care cost* | | | | | | | | | | | | |
| 0 | 123±219 | 24±60 | 117±422 | 31±56 | 1509±11449 | 207±347 | 347±1699 | 2990±6214 | 227±766 | 31±83 | 15±37 | 400±4104 |
| 1 | 143±293 | 31±70 | 46±116 | 84±152 | 2512±8030 | 483±695 | 420±836 | 6840±15193 | 282±490 | 6.0±10.6 | 69±103 | 1082±5895 |
| 2 | 279±392 | 13±11 | 115±403 | 4.9±8.4 | 349±676 | 176±263 | 642±347 | 1180±1417 | 696±984 | 873±1960 | 178±98 | 258±639 |
| *Private level- social care cost* | | | | | | | | | | | | |
| 0 | 636±5000 | 528±2383 | 939±3244 | 0 | 643±2964 | 667±2308 | 95±709 | 3193±3979 | 100±486 | 0 | 0 | 578±3074 |
| 1 | 2412±4800 | 2620±3917 | 3383±4821 | 5247±7260 | 2837±5055 | 923±2855 | 525±1229 | 5363±7478 | 1890±2719 | 0 | 464±688 | 2502±4765 |
| 2 | 3462±5278 | 2380±4077 | 6057±13087 | 1996±3456 | 3195±5854 | 1779±4543 | 0 | 0 | 0 | 875±1582 | 667±1010 | 3602±8718 |
| *Public level-total cost* | | | | | | | | | | | | |
| 0 | 1014±2571 | 1844±4143 | 3188±8667 | 1389±3690 | 2721±6334 | 1566±3384 | 1893±5566 | 10789±9354 | 1504±3174 | 298±2156 | 155±778 | 2006±5255 |
| 1 | 9483±5242 | 15384±9541 | 16431±10248 | 23727±14197 | 21316±11602 | 11539±9763 | 21080±11293 | 21187±11468 | 18046±8711 | 12832±9104 | 7246±3027 | 14020±9812 |
| 2 | 8134±3841 | 13772±6549 | 29502±10994 | 25688±4222 | 20729±10873 | 21255±11475 | 18657±3317 | 21816±12775 | 19731±867 | 16293±8802 | 8253±1594 | 20976±12174 |
| *Public level- medical care cost* | | | | | | | | | | | | |
| 0 | 122±267 | 179±421 | 176±455 | 157±268 | 281±609 | 208±306 | 411±1647 | 588±2125 | 15±56 | 25±51 | 33±52 | 187±744 |
| 1 | 86±206 | 130±262 | 185±309 | 183±260 | 1862±6600 | 545±712 | 1078±1690 | 735±2114 | 50±144 | 180±504 | 146±245 | 384±2080 |
| 2 | 198±347 | 208±248 | 149±209 | 0 | 655±2177 | 370±554 | 620±327 | 381±656 | 114±161 | 217±431 | 215±187 | 274±857 |
| *Public level- social care cost* | | | | | | | | | | | | |
| 0 | 892±2551 | 1664±4099 | 3012±8699 | 1231±3717 | 2440±6209 | 1359±3384 | 1482±5412 | 10201±8792 | 1489±3142 | 273±2135 | 122±782 | 1819±5132 |
| 1 | 9396±5242 | 15255±9534 | 16246±10394 | 23544±14026 | 19454±11842 | 10994±9945 | 20002±10534 | 20452±11498 | 17997±8730 | 12652±9266 | 7099±2946 | 13636±9657 |
| 2 | 7936±3819 | 13564±6616 | 29354±10961 | 25688±4222 | 20074±9812 | 20885±11398 | 18037±3644 | 21434±12522 | 19618±1028 | 16076±8998 | 8038±1498 | 20702±12057 |

**Table 5.21. Cost differences (in 2008 international dollars) among participants with dementia who receive or do not receive supervision, by site**

| Need supervision | Cuba | Dominican Republic | Peru (urban) | Peru (rural) | Venezuela | Mexico (urban) | Mexico (rural) | China (urban) | China (rural) | India (urban) | India (rural) | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Private level-total cost* | | | | | | | | | | | | |
| Yes | 3427±8488 | 1841±3242 | 5845±11733 | 4665±6244 | 3907±6598 | 2206±4250 | 973±1867 | 7110±7549 | 1276±1254 | 959±1760 | 1234±994 | 3613±7823 |
| No | 1049±3256 | 994±2971 | 755±2679 | 30±55 | 2385±12449 | 780±2071 | 443±1739 | 8844±13481 | 708±1820 | 29±81 | 86±206 | 1405±5908 |
| *Private level- medical care cost* | | | | | | | | | | | | |
| Yes | 144±232 | 17±23 | 98±358 | 62±130 | 798±3572 | 304±504 | 195±296 | 2549±3567 | 272±551 | 482±1457 | 129±131 | 358±1733 |
| No | 140±273 | 26±65 | 119±425 | 30±55 | 1961±12283 | 241±417 | 391±1703 | 4942±11917 | 254±731 | 29±81 | 27±59 | 605±4927 |
| *Private level- social care cost* | | | | | | | | | | | | |
| Yes | 3284±8437 | 1824±3242 | 5747±11755 | 4603±6272 | 3109±5872 | 1902±4355 | 777±1902 | 4560±7055 | 1004±1377 | 477±1208 | 1105±1080 | 3255±7683 |
| No | 909±3221 | 968±2954 | 636±2670 | 0 | 424±1870 | 539±2083 | 52±358 | 3903±5676 | 453±1560 | 0 | 59±201 | 800±2858 |
| *Public level-total cost* | | | | | | | | | | | | |
| Yes | 10725±4534 | 18860±8633 | 27512±12388 | 27088±8785 | 20313±11112 | 17984±12613 | 20799±14090 | 19543±10148 | 11927±4510 | 17780±7440 | 10541±3202 | 18648±11386 |
| No | 2636±4400 | 3470±6322 | 2104±4614 | 1550±3726 | 1966±5330 | 3317±5728 | 2385±5369 | 15286±11795 | 5283±9112 | 360±1394 | 1492±2733 | 3428±6722 |
| *Public level- medical care cost* | | | | | | | | | | | | |
| Yes | 119±253 | 125±232 | 143±229 | 131±230 | 531±1530 | 439±539 | 616±1336 | 203±385 | 60±97 | 135±323 | 270±383 | 251±748 |
| No | 113±255 | 174±402 | 189±458 | 152±265 | 671±3570 | 260±457 | 490±1691 | 716±2215 | 23±87 | 43±182 | 51±88 | 241±1321 |
| *Public level- social care cost* | | | | | | | | | | | | |
| Yes | 10606±4539 | 18735±8630 | 27369±12386 | 26958±8660 | 19782±10746 | 17546±12661 | 20184±13429 | 19340±10055 | 11867±4447 | 17646±7584 | 10271±3114 | 18398±11286 |
| No | 2523±4404 | 3296±6302 | 1915±4628 | 1399±3759 | 1295±3705 | 3058±5691 | 1895±4950 | 14570±11494 | 5260±9096 | 316±1312 | 1441±2699 | 3188±6507 |

**Table 5.22. Linear regression model of private level medical care cost**

| Variables | Observed coefficients | Bootstrapped 95% confidence interval |
|---|---|---|
| Centre | | |
| Cuba | Reference | |
| Dominican Republic | -121 | -633 to 499 |
| Urban Peru | -749 | -1838 to 102 |
| Rural Peru | -418 | -1303 to 360 |
| Venezuela | 1806 | -145 to 4761 |
| Urban Mexico | -244 | -902 to 389 |
| Rural Mexico | 194 | -388 to 840 |
| Urban China | 3864 | 1619 to 6937* |
| Rural China | -35 | -838 to 942 |
| Urban India | 868 | -7.7 to 2335 |
| Rural India | 450 | -239 to 1458 |
| Male | 237 | -218 to 882 |
| Age | -9.2 | -36 to 12 |
| Education level of participants | | |
| No education | Reference | |
| Less than primary | -164 | -965 to 463 |
| Completed primary | -437 | -1136 to 86 |
| Completed secondary or higher | 484 | -938 to 2276 |
| Marital status of participants | | |
| Single | Reference | |
| Married | 439 | -176 to 1360 |
| Divorced/widowed | 316 | -313 to 1203 |
| Living arrangement of participants | | |
| Living alone | Reference | |
| Living with spouse | 118 | -578 to 1096 |
| Living with children | -586 | -1323 to -48* |
| Living with other relatives | -339 | -1123 to 358 |
| Living with children under 16 | -254 | -656 to 100 |
| Participants with any income | -11 | -375 to 443 |
| Number of assets in the family | 88 | -38 to 207 |
| Participant has private insurance | 804 | -32 to 1952 |
| Male carers | -595 | -1187 to -178* |
| Age of carers | 3.2 | -12 to 24 |
| Education level of carers | | |
| Less than primary | Reference | |
| Completed primary | 170 | -248 to 606 |
| Completed secondary | 468 | -193 to 1268 |
| Completed tertiary | 802 | -376 to 2587 |
| Marital status of carers | | |
| Single | Reference | |
| Married | 231 | -168 to 810 |
| Divorced/widowed | 274 | -228 to 935 |
| Carers with paid work | 2.7 | -310 to 333 |
| Carers' relationship to participants | | |
| Spouse | Reference | |
| Children | -303 | -1369 to 588 |
| Children in law or other relatives | -437 | -1313 to 307 |
| Non-relative | -759 | -1623 to -36* |
| Depression | 794 | -242 to 2302 |
| Hypertension | 174 | -209 to 639 |
| Diabetes | -385 | -1392 to 466 |
| Ischemic heart disease | -646 | -1502 to 29 |
| Stroke | -194 | -1227 to 719 |
| COPD | -1033 | -2182 to -203* |
| Number of physical impairment | 335 | 50 to 780* |
| Memory impairment score | 61 | -53 to 169 |

| | | |
|---|---|---|
| Number of cognitive impairment (not include memory) | 236 | -97 to 674 |
| BPSD severity score | -25 | -82 to 20 |
| Constant | -427 | -3358 to 1564 |

* Significant at 95% level, $R^2$=0.11, adjusted $R^2$=0.07

**Table 5.23. Linear regression model of public level medical care cost**

| Variables | Observed coefficients | Bootstrapped 95% confidence interval |
|---|---|---|
| Centre | | |
| Cuba | Reference | |
| Dominican Republic | -78 | -359 to 111 |
| Urban Peru | -69 | -407 to 170 |
| Rural Peru | -77 | -570 to 238 |
| Venezuela | 574 | 73 to 1290* |
| Urban Mexico | 160 | -90 to 362 |
| Rural Mexico | 431 | 146 to 799* |
| Urban China | 452 | 57 to 942* |
| Rural China | -166 | -562 to 124 |
| Urban India | 105 | -65 to 322 |
| Rural India | 148 | -73 to 431 |
| Male | -6.8 | -211 to 189 |
| Age | -1.3 | -8.5 to 6.5 |
| Education level of participants | | |
| No education | Reference | |
| Less than primary | 186 | -35 to 440 |
| Completed primary | -20 | -191 to 112 |
| Completed secondary or higher | 143 | -24 to 331 |
| Marital status of participants | | |
| Single | Reference | |
| Married | -43 | -194 to 115 |
| Divorced/widowed | 27 | -109 to 203 |
| Living arrangement of participants | | |
| Living alone | Reference | |
| Living with spouse | -82 | -469 to 179 |
| Living with children | 1.5 | -395 to 305 |
| Living with other relatives | 38 | -335 to 351 |
| Living with children under 16 | -206 | -530 to 7.2 |
| Participants with any income | -128 | -388 to 65 |
| Number of assets in the family | 36 | -18 to 103 |
| Participant has private insurance | 206 | -67 to 629 |
| Male carers | -145 | -284 to -40* |
| Age of carers | 0.2 | -4.6 to 5 |
| Education level of carers | | |
| Less than primary | Reference | |
| Completed primary | 153 | -39 to 406 |
| Completed secondary | -12 | -206 to 148 |
| Completed tertiary | -44 | -330 to 208 |
| Marital status of carers | | |
| Single | Reference | |
| Married | 139 | 1.9 to 313* |
| Divorced/widowed | 241 | -69 to 724 |
| Carers with paid work | 73 | -96 to 318 |
| Carers' relationship to participants | | |
| Spouse | Reference | |
| Children | 44 | -126 to 204 |
| Children in law or other relatives | -32 | -233 to 132 |
| Non-relative | -209 | -464 to -16* |
| Depression | 204 | -58 to 664 |
| Hypertension | -105 | -383 to 73 |
| Diabetes | 8.4 | -218 to 182 |
| Ischemic heart disease | -68 | -242 to 94 |
| Stroke | 167 | 10 to 325* |
| COPD | -88 | -298 to 114 |
| Number of physical impairment | 1.3 | -60 to 46 |
| Memory impairment score | 26 | -22 to 93 |

| | | |
|---|---|---|
| Number of cognitive impairment (not include memory) | 1.2 | -53 to 70 |
| BPSD severity score | -0.3 | -7.2 to 9.4 |
| Constant | 35 | -587 to 649 |

* Significant at 95% level, $R^2$=0.06, adjusted $R^2$=0.02

**Table 5.24. Linear regression model of private level informal care cost**

| Variables | Observed coefficients | Bootstrapped 95% confidence interval |
|---|---|---|
| Centre | | |
| Cuba | Reference | |
| Dominican Republic | -660 | -1311 to -51* |
| Urban Peru | -769 | -1405 to -240* |
| Rural Peru | 17 | -1013 to 1146 |
| Venezuela | -536 | -1119 to 78 |
| Urban Mexico | -387 | -1341 to 481 |
| Rural Mexico | -918 | -1747 to -229* |
| Urban China | 315 | -1074 to 1955 |
| Rural China | -275 | -1291 to 653 |
| Urban India | -122 | -768 to 562 |
| Rural India | -152 | -825 to 458 |
| Male | -26 | -316 to 294 |
| Age | 12 | -8.5 to 33 |
| Education level of participants | | |
| No education | Reference | |
| Less than primary | -11 | -342 to 336 |
| Completed primary | -57 | -535 to 437 |
| Completed secondary or higher | 172 | -557 to 859 |
| Marital status of participants | | |
| Single | Reference | |
| Married | -11 | -575 to 545 |
| Divorced/widowed | 84 | -492 to 656 |
| Living arrangement of participants | | |
| Living alone | Reference | |
| Living with spouse | 541 | -88 to 1306 |
| Living with children | -27 | -423 to 342 |
| Living with other relatives | 801 | 133 to 1548* |
| Living with children under 16 | -130 | -444 to 159 |
| Participants with any income | 29 | -277 to 361 |
| Number of assets number in the family | 28 | -70 to 128 |
| Participant has private insurance | -117 | -471 to 261 |
| Male carers | -73 | -648 to 723 |
| Age of carers | 0.07 | -9.7 to 9.2 |
| Education level of carers | | |
| Less than primary | Reference | |
| Completed primary | -189 | -503 to 103 |
| Completed secondary | -86 | -458 to 265 |
| Completed tertiary | 139 | -365 to 686 |
| Marital status of carers | | |
| Single | Reference | |
| Married | -19 | -522 to 523 |
| Divorced/widowed | -252 | -811 to 313 |
| Carers with paid work | 1480 | 1025 to 2004* |
| Carers' relationship to participants | | |
| Spouse | Reference | |
| Children | 543 | -27 to 1150 |
| Children in law or other relatives | 227 | -294 to 785 |
| Non-relative | -99 | -688 to 481 |
| Depression | -109 | -527 to 286 |
| Hypertension | -81 | -566 to 312 |
| Diabetes | 97 | -321 to 575 |
| Ischemic heart disease | 603 | -481 to 1741 |
| Stroke | 56 | -444 to 572 |
| COPD | 274 | -337 to 991 |
| Number of physical impairment | 45 | -78 to 166 |
| Memory impairment score | -69 | -195 to 38 |

| | | |
|---|---|---|
| Number of cognitive impairment (not include memory) | 374 | 133 to 665* |
| BPSD severity score | 43 | 5.1 to 86* |
| Constant | -1825 | -4416 to 417 |

* Significant at 95% level, $R^2$=0.13, adjusted $R^2$=0.09

*Public level informal care cost model*

Public level informal care costs are significantly greater for participants living in Peru, Mexico, China, and India than for those living in Cuba (Table 5.25). Older age, higher education attainment, and not living alone all are associated with higher costs. Participants with carers who are divorced have higher costs compared to those with single carers. There are higher costs if the participants had diabetes, stroke, greater physical impairment, severe cognitive impairment or more severe BPSD symptoms. Finally, participants with older carers have lower costs for informal care than those with younger carers. This model was relatively powerful, explaining 33% of the variation in public level informal care costs.

*Private level social care cost model*

Participants living in urban China have significantly higher private level social care costs than those living in Cuba (Table 5.26). Living with spouses or other persons, having income, having more assets in the family, having carers who are in paid work, having carers who are children or non-relatives all are associated with higher private level social care costs. More severe cognitive impairment or more severe BPSD are also associated with higher costs. One-fifth of the variation in cost was explained by this model.

*Public level social care cost model*

The predictors of cost for social care at the public level are similar to those at the private level (Table 5.27). Participants living in Peru, Mexico, China, or India have significantly higher costs than those living in Cuba. Older age and higher education level, and not living alone all predict higher costs. Higher costs are associated with diabetes, stroke, more physical impairment, more severe cognitive impairment and more severe BPSD symptom. If the carers are older then the costs are lower and men also have lower costs than women (on average by I$1174). Thirty-five percent of variation could be explained by this regression model.

*Paid home care model*

Participants living in the Dominican Republic, urban Peru, or urban China have higher cost for paid home care than those living in Cuba (Table 5.28). Costs are significantly higher for participants who are married, with income, and having more

**Table 5.25. Linear regression model of public level informal care costs**

| Variables | Observed coefficients | Bootstrapped 95% confidence interval |
|---|---|---|
| Centre | | |
| Cuba | Reference | |
| Dominican Republic | 30 | -1281 to 1401 |
| Urban Peru | 5975 | 3194 to 8827* |
| Rural Peru | 6729 | 2789 to 11484* |
| Venezuela | 1106 | -687 to 2794 |
| Urban Mexico | 5548 | 3186 to 7981* |
| Rural Mexico | 2639 | 526 to 4661* |
| Urban China | 9245 | 6849 to 11883* |
| Rural China | 6539 | 3309 to 10124* |
| Urban India | 3999 | 1911 to 6103* |
| Rural India | 3931 | 2045 to 5819* |
| Male | -947 | -2025 to 193 |
| Age | 76 | 8.4 to 138* |
| Education level of participants | | |
| No education | Reference | |
| Less than primary | 1372 | 72 to 2572* |
| Completed primary | 1866 | 539 to 3182* |
| Completed secondary or higher | 2178 | 332 to 3853* |
| Marital status of participants | | |
| Single | Reference | |
| Married | 538 | -1316 to 2164 |
| Divorced/widowed | 367 | -1344 to 2097 |
| Living arrangement of participants | | |
| Living alone | Reference | |
| Living with spouse | 4091 | 2586 to 5540* |
| Living with children | 3523 | 2259 to 4848* |
| Living with other relatives | 3951 | 2286 to 5612* |
| Living with children under 16 | -921 | -1946 to 148 |
| Participants with any income | -357 | -1440 to 691 |
| Number of assets in the family | 82 | -297 to 471 |
| Participant has private insurance | -1103 | -2665 to 565 |
| Male carers | -753 | -1771 to 211 |
| Age of carers | -60 | -99 to -20* |
| Education level of carers | | |
| Less than primary | Reference | |
| Completed primary | 614 | -745 to 1844 |
| Completed secondary | -299 | -1728 to 1025 |
| Completed tertiary | 374 | -1199 to 1944 |
| Marital status of carers | | |
| Single | Reference | |
| Married | 1502 | -62 to 2966 |
| Divorced/widowed | 1833 | 76 to 3526* |
| Carers with paid work | -284 | -1172 to 660 |
| Carers' relationship to participants | | |
| Spouse | Reference | |
| Children | -1564 | -3230 to 191 |
| Children in law or other relatives | -1087 | -2990 to 872 |
| Non-relative | 272 | -2129 to 2763 |
| Depression | 804 | -658 to 2281 |
| Hypertension | -20 | -889 to 805 |
| Diabetes | 1545 | 164 to 2803* |
| Ischemic heart disease | 312 | -1248 to 1808 |
| Stroke | 1987 | 578 to 3390* |
| COPD | 280 | -1456 to 2095 |
| Number of physical impairment | 433 | 105 to 759* |
| Memory impairment score | -131 | -371 to 100 |

| | | |
|---|---|---|
| Number of cognitive impairment (not include memory) | 2480 | 2016 to 2932* |
| BPSD severity score | 155 | 60 to 251* |
| Constant | -9727 | -15588 to -3826* |

* Significant at 95% level, $R^2$=0.33, adjusted $R^2$=0.30

**Table 5.26. Linear regression model of private level social care costs**

| Variables | Observed coefficients | Bootstrapped 95% confidence interval |
|---|---|---|
| Centre | | |
| Cuba | Reference | |
| Dominican Republic | -200 | -958 to 491 |
| Urban Peru | 292 | -557 to 1200 |
| Rural Peru | 330 | -764 to 1490 |
| Venezuela | -336 | -1035 to 377 |
| Urban Mexico | -479 | -1494 to 471 |
| Rural Mexico | -734 | -1663 to 57 |
| Urban China | 2394 | 772 to 4324* |
| Rural China | -113 | -1244 to 925 |
| Urban India | 223 | -566 to 992 |
| Rural India | 174 | -647 to 934 |
| Male | -253 | -630 to 153 |
| Age | 16 | -6.2 to 39 |
| Education level of participants | | |
| No education | Reference | |
| Less than primary | -44 | -453 to 344 |
| Completed primary | -18 | -607 to 558 |
| Completed secondary or higher | 391 | -459 to 1151 |
| Marital status of participants | | |
| Single | Reference | |
| Married | 335 | -293 to 1024 |
| Divorced/widowed | 328 | -336 to 971 |
| Living arrangement of participants | | |
| Living alone | Reference | |
| Living with spouse | 835 | 61 to 1727* |
| Living with children | 164 | -440 to 717 |
| Living with other relatives | 1110 | 201 to 2077* |
| Living with children under 16 | -263 | -644 to 102 |
| Participants with any income | 388 | 27 to 754* |
| Number of assets in the family | 133 | 13 to 265* |
| Participant has private insurance | -307 | -737 to 159 |
| Male carers | -151 | -778 to 663 |
| Age of carers | -5.5 | -19 to 8.2 |
| Education level of carers | | |
| Less than primary | Reference | |
| Completed primary | -234 | -685 to 160 |
| Completed secondary | -328 | -796 to 142 |
| Completed tertiary | -18 | -684 to 641 |
| Marital status of carers | | |
| Single | Reference | |
| Married | -13 | -569 to 631 |
| Divorced/widowed | -437 | -1091 to 207 |
| Carers with paid work | 1871 | 1360 to 2410* |
| Carers' relationship to participants | | |
| Spouse | Reference | |
| Children | 848 | 168 to 1573* |
| Children in law or other relatives | 606 | -69 to 1332 |
| Non-relative | 1326 | 441 to 2246* |
| Depression | -54 | -562 to 478 |
| Hypertension | -162 | -696 to 270 |
| Diabetes | 32 | -430 to 583 |
| Ischemic heart disease | 638 | -495 to 1920 |
| Stroke | 109 | -465 to 671 |
| COPD | 295 | -432 to 1091 |
| Number of physical impairment | 14 | -128 to 143 |
| Memory impairment score | -45 | -183 to 83 |

| | | |
|---|---|---|
| Number of cognitive impairment (not include memory) | 599 | 330 to 918* |
| BPSD severity score | 56 | 11 to 103* |
| Constant | -3407 | -6185 to -831* |

* Significant at 95% level, $R^2$=0.20, adjusted $R^2$=0.16

**Table 5.27. Linear regression model of public level social care** costs

| Variables | Observed coefficients | Bootstrapped 95% confidence interval |
|---|---|---|
| Centre | | |
| Cuba | Reference | |
| Dominican Republic | 489 | -920 to 1964 |
| Urban Peru | 7036 | 4000 to 10162* |
| Rural Peru | 7042 | 3066 to 11712* |
| Venezuela | 1307 | -608 to 3136 |
| Urban Mexico | 5457 | 3170 to 7907* |
| Rural Mexico | 2823 | 604 to 4858* |
| Urban China | 11324 | 8640 to 14248* |
| Rural China | 6701 | 3326 to 10455* |
| Urban India | 4343 | 2227 to 6485* |
| Rural India | 4257 | 2181 to 6195* |
| Male | -1174 | -2315 to -30* |
| Age | 81 | 10 to 145 |
| Education level of participants | | |
| No education | Reference | |
| Less than primary | 1340 | -28 to 2570 |
| Completed primary | 1904 | 555 to 3299* |
| Completed secondary or higher | 2397 | 495 to 4100* |
| Marital status of participants | | |
| Single | Reference | |
| Married | 885 | -1004 to 2583 |
| Divorced/widowed | 611 | -1129 to 2372 |
| Living arrangement of participants | | |
| Living alone | Reference | |
| Living with spouse | 4385 | 2872 to 5904* |
| Living with children | 3714 | 2417 to 5217* |
| Living with other relatives | 4259 | 2509 to 6095* |
| Living with children under 16 | -1054 | -2123 to 8.1 |
| Participants with any income | 3.3 | -1138 to 1156 |
| Number of assets in the family | 188 | -188 to 578 |
| Participant has private insurance | -1293 | -2961 to 516 |
| Male carers | -830 | -1880 to 248 |
| Age of carers | -66 | -109 to -22* |
| Education level of carers | | |
| Less than primary | Reference | |
| Completed primary | 570 | -808 to 1915 |
| Completed secondary | -541 | -2026 to 769 |
| Completed tertiary | 217 | -1485 to 1885 |
| Marital status of carers | | |
| Single | Reference | |
| Married | 1507 | -75 to 3101 |
| Divorced/widowed | 1647 | -174 to 3389 |
| Carers with paid work | 106 | -848 to 1116 |
| Carers' relationship to participants | | |
| Spouse | Reference | |
| Children | -1260 | -3031 to 623 |
| Children in law or other relatives | -707 | -2731 to 1335 |
| Non-relative | 1697 | -1035 to 4631 |
| Depression | 859 | -651 to 2444 |
| Hypertension | -100 | -1005 to 782 |
| Diabetes | 1480 | 67 to 2794* |
| Ischemic heart disease | 347 | -1318 to 1975 |
| Stroke | 2040 | 564 to 3515* |
| COPD | 301 | -1566 to 2200 |
| Number of physical impairment | 401 | 51 to 741* |
| Memory impairment score | -107 | -359 to 132 |

| | | |
|---|---|---|
| Number of cognitive impairment (not include memory) | 2704 | 2205 to 3187* |
| BPSD severity score | 167 | 69 to 271* |
| Constant | -11309 | -17091 to -5182* |

* Significant at 95% level, $R^2$=0.35, adjusted $R^2$=0.32

**Table 5.28. Linear regression model of paid home care**

| Variables | Observed coefficients | Bootstrapped 95% confidence interval |
|---|---|---|
| Centre | | |
| Cuba | Reference | |
| Dominican Republic | 459* | 90 to 822* |
| Urban Peru | 1061* | 419 to 1755* |
| Rural Peru | 312 | -81 to 738 |
| Venezuela | 200 | -102 to 554 |
| Urban Mexico | -92 | -408 to 247 |
| Rural Mexico | 184 | -114 to 500 |
| Urban China | 2079* | 1293 to 2910* |
| Rural China | 162 | -219 to 571 |
| Urban India | 344 | -8.6 to 734 |
| Rural India | 326 | -95 to 725 |
| Male | -227* | -432 to -26* |
| Age | 4.5 | -6.9 to 15 |
| Education level of participants | | |
| No education | Reference | |
| Less than primary | -33 | -246 to 152 |
| Completed primary | 38 | -199 to 298 |
| Completed secondary or higher | 218 | -165 to 608 |
| Marital status of participants | | |
| Single | Reference | |
| Married | 346* | 23 to 718* |
| Divorced/widowed | 244 | -33 to 525 |
| Living arrangement of participants | | |
| Living alone | Reference | |
| Living with spouse | 293 | -83 to 652 |
| Living with children | 191 | -199 to 594 |
| Living with other relatives | 308 | -169 to 796 |
| Living with children under 16 | -134 | -346 to 89 |
| Participants with any income | 359* | 177 to 559* |
| Number of assets in the family | 105* | 45 to 178* |
| Participant has private insurance | -190 | -482 to 106 |
| Male carers | -78 | -309 to 170 |
| Age of carers | -5.6 | -15 to 3.4 |
| Education level of carers | | |
| Less than primary | Reference | |
| Completed primary | -45 | -302 to 223 |
| Completed secondary | -242 | -544 to 40 |
| Completed tertiary | -157 | -506 to 182 |
| Marital status of carers | | |
| Single | Reference | |
| Married | 5.8 | -305 to 337 |
| Divorced/widowed | -186 | -529 to 154 |
| Carers with paid work | 390* | 168 to 611* |
| Carers' relationship to participants | | |
| Spouse | Reference | |
| Children | 304 | -39 to 675 |
| Children in law or other relatives | 379* | 21 to 783* |
| Non-relative | 1425* | 828 to 2159* |
| Depression | 54 | -196 to 298 |
| Hypertension | -81 | -282 to 111 |
| Diabetes | -66 | -305 to 170 |
| Ischemic heart disease | 35 | -299 to 426 |
| Stroke | 53 | -212 to 358 |
| COPD | 21 | -353 to 441 |
| Number of physical impairment | -32 | -98 to 32 |
| Memory impairment score | 24 | -29 to 78 |

| | | |
|---|---|---|
| Number of cognitive impairment (not include memory) | 224* | 120 to 337* |
| BPSD severity score | 12 | -6.1 to 34 |
| Constant | -1582* | -2920 to -355* |

* Significant at 95% level, $R^2$=0.24, adjusted $R^2$=0.21

family assets. Participants with carers who have paid work also have significantly higher paid home care costs as do those with carers who are 'other' relatives, or non-relatives. Cognitive impairment is again a strong predictors of cost. Finally, men have lower costs than women. Just under one-quarter of variation was explained.

*Private level total cost model*

The model with all private level costs summed shows that participants living in urban China have higher cost than those living in Cuba (Table 5.29). Having more family assets and having carers in paid work are predictors of total cost at the private level. Higher costs are also associated with greater physical and cognitive impairment. The model could explain 17% of variation in these costs.

*Public level total cost model*

The final model shows that participants living in Peru, Mexico, China, or India have higher public level total costs than those living in Cuba (Table 5.30). Older age, higher education level, and not living alone all predict higher costs. Diabetes, stroke, more physical impairments, severe cognitive impairment or BPSD symptoms each have a positive impact on cost. Male participants have lower total costs than females. Participants with older carers have lower costs than those with younger carers. Living with children younger than 16 years old has a negative association with total cost. This model could explain one-third of the variation in costs.

## Summary of section

The total cost per capita at the private level in the sample as a whole is I$1887, while the cost at the public level is I$6570. The distribution of costs is different for private level and public level. At the public level, 96.4% cost is from social care, and 90.4% of cost of social care is from informal care. Medical care costs are more prominent at the private level than that at public level (29.2% vs 3.6%). Informal care and paid home care contribute similar proportions to the cost of social care at the private level, while informal care is 90.4% of the cost of social care at the public level.

Physical impairment increases the cost of medical care and total cost at the private

level, while stroke predicts higher medical costs at the public level. Diabetes, stroke, and physical impairment predict higher costs of informal care, social care and total cost at the public level only

Cognitive impairment and BPSD has no significant association with the cost of medical care, but predict higher costs of informal care and social care both at the private level and the public level, and only increase total costs at the public level. Cognitive impairment is also associated with higher costs of paid care and total cost at the private level.

Participants with dementia who are in the older age group, with a higher educational level, or who are not living alone have higher costs of informal care, social care and total cost at the public level. Male participants have lower costs of paid home care, social care and total cost at the public level.

Younger age of carers is associated with higher costs of informal care, social care and total cost at the public level. Participants with male carers have higher costs of medical care both at the private level and the public level.

Finally, it was found that higher economic status (reflected by having income, more assets in the family, or carers with paid work) predicts higher costs of paid home care, and social care and total cost at the private level only.

**Table 5.29. Linear regression model of private level total costs**

| Variables | Observed coefficients | Bootstrapped 95% confidence interval |
|---|---|---|
| Centre | | |
| Cuba | Reference | |
| Dominican Republic | -321 | -1234 to 591 |
| Urban Peru | -456 | -1825 to 774 |
| Rural Peru | -88 | -1577 to 1301 |
| Venezuela | 1470 | -621 to 4527 |
| Urban Mexico | -722 | -1877 to 370 |
| Rural Mexico | -539 | -1627 to 464 |
| Urban China | 6259 | 3379 to 9627* |
| Rural China | -147 | -1435 to 1267 |
| Urban India | 1091 | -186 to 2676 |
| Rural India | 625 | -438 to 1851 |
| Male | -16 | -619 to 725 |
| Age | 7.7 | -28 to 38 |
| Education level of participants | | |
| No education | Reference | |
| Less than primary | -208 | -1146 to 531 |
| Completed primary | -455 | -1348 to 345 |
| Completed secondary or higher | 875 | -725 to 2781 |
| Marital status of participants | | |
| Single | Reference | |
| Married | 775 | -178 to 1926 |
| Divorced/widowed | 645 | -196 to 1654 |
| Living arrangement of participants | | |
| Living alone | Reference | |
| Living with spouse | 953 | -35 to 2190 |
| Living with children | -421 | -1376 to 372 |
| Living with other relatives | 771 | -391 to 1906 |
| Living with children under 16 | -516 | -1073 to 20 |
| Participants with any income | 378 | -147 to 958 |
| Number of assets in the family | 221 | 50 to 406* |
| Participant has private insurance | 498 | -439 to 1679 |
| Male carers | -745 | -1570 to 290 |
| Age of carers | -2.2 | -24 to 23 |
| Education level of carers | | |
| Less than primary | Reference | |
| Completed primary | -64 | -678 to 539 |
| Completed secondary | 140 | -687 to 1109 |
| Completed tertiary | 785 | -632 to 2665 |
| Marital status of carers | | |
| Single | Reference | |
| Married | 218 | -506 to 1128 |
| Divorced/widowed | -163 | -975 to 817 |
| Carers with paid work | 1873 | 1275 to 2478* |
| Carers' relationship to participants | | |
| Spouse | Reference | |
| Children | 546 | -642 to 1697 |
| Children in law or other relatives | 170 | -897 to 1309 |
| Non-relative | 567 | -627 to 1787 |
| Depression | 740 | -509 to 2280 |
| Hypertension | 13 | -644 to 645 |
| Diabetes | -353 | -1445 to 607 |
| Ischemic heart disease | -6.5 | -1385 to 1339 |
| Stroke | -84 | -1352 to 994 |
| COPD | -738 | -1892 to 443 |
| Number of physical impairment | 349 | 26 to 811* |
| Memory impairment score | 16 | -147 to 179 |

| | | |
|---|---|---|
| Number of cognitive impairment (not include memory) | 835 | 377 to 1399* |
| BPSD severity score | 31 | -42 to 96 |
| Constant | -3834 | -8069 to -493* |

* Significant at 95% level, $R^2$=0.17, adjusted $R^2$=0.14

**Table 5.30. Linear regression model of public level total cost**

| Variables | Observed coefficients | Bootstrapped 95% confidence interval |
|---|---|---|
| Centre | | |
| Cuba | Reference | |
| Dominican Republic | 411 | -1026 to 1853 |
| Urban Peru | 6968 | 3920 to 10072* |
| Rural Peru | 6966 | 2997 to 11729* |
| Venezuela | 1881 | -98 to 3841 |
| Urban Mexico | 5617 | 3299 to 8125* |
| Rural Mexico | 3254 | 1023 to 5450* |
| Urban China | 11776 | 8999 to 14739* |
| Rural China | 6536 | 3123 to 10244* |
| Urban India | 4449 | 2327 to 6606* |
| Rural India | 4406 | 2373 to 6295* |
| Male | -1180 | -2394 to -25* |
| Age | 80 | 7.4 to 144* |
| Education level of participants | | |
| No education | Reference | |
| Less than primary | 1527 | 133 to 2772* |
| Completed primary | 1885 | 479 to 3281* |
| Completed secondary or higher | 2541 | 599 to 4239* |
| Marital status of participants | | |
| Single | Reference | |
| Married | 842 | -1092 to 2542 |
| Divorced/widowed | 639 | -1123 to 2395 |
| Living arrangement of participants | | |
| Living alone | Reference | |
| Living with spouse | 4303 | 2812 to 5966* |
| Living with children | 3716 | 2307 to 5322* |
| Living with other relatives | 4298 | 2432 to 6234* |
| Living with children under 16 | -1259 | -2335 to -155* |
| Participants with any income | -125 | -1265 to 1063 |
| Number of assets in the family | 225 | -171 to 622 |
| Participant has private insurance | -1086 | -2798 to 654 |
| Male carers | -974 | -2029 to 81 |
| Age of carers | -66 | -111 to -20* |
| Education level of carers | | |
| Less than primary | Reference | |
| Completed primary | 723 | -704 to 2113 |
| Completed secondary | -552 | -2112 to 794 |
| Completed tertiary | 173 | -1629 to 1988 |
| Marital status of carers | | |
| Single | Reference | |
| Married | 1647 | 50 to 3227* |
| Divorced/widowed | 1889 | -34 to 3713 |
| Carers with paid work | 180 | -782 to 1215 |
| Carers' relationship to participants | | |
| Spouse | Reference | |
| Children | -1216 | -2930 to 690 |
| Children in law or other relatives | -739 | -2784 to 1363 |
| Non-relative | 1488 | -1236 to 4487 |
| Depression | 1063 | -498 to 2662 |
| Hypertension | -205 | -1207 to 706 |
| Diabetes | 1488 | 70 to 2864* |
| Ischemic heart disease | 279 | -1376 to 1966 |
| Stroke | 2208 | 717 to 3663* |
| COPD | 214 | -1652 to 2094 |
| Number of physical impairment | 403 | 49 to 756* |
| Memory impairment score | -80 | -343 to 182 |

| | | |
|---|---|---|
| Number of cognitive impairment (not include memory) | 2705 | 2195 to 3197* |
| BPSD severity score | 167 | 68 to 271* |
| Constant | -11273 | -17157 to -5209* |

* Significant at 95% level, $R^2$=0.35, adjusted $R^2$=0.32

# Section 6. Attributable cost of dementia

The previous section has reported costs for those people with dementia in the 10/66 survey. This section focuses on the entire 10/66 sample and determines the cost of care that is attributable to dementia and each level of severity, and other chronic diseases. Regression methods are used to calculate the attributable costs. Subsequently, the attributable costs per capita are used for generating the total cost at the country level by linking these to the prevalence of dementia among people aged 65 years and over.

## 6.1. Methodology

As discussed in Section 1, both the subtraction method and the regression method can be used for the estimation of attributable costs. The advantages and disadvantages of the two methods have also been discussed. Regression methods were chosen as the most appropriate approach to generate the attributable cost, as it would be difficult to select proper matching controls for the subtracting method.

In the analysis, linear regression models were generated to estimate the care costs that can be attributed specifically to dementia. For this, the whole sample was used. As in Section 5, bootstrapping was used because of the non-normal distribution of data (see Tables 4.1 and 4.4). That can resolve the potential problem of using regression models when data are highly skewed.

As discussed in Section 5, a number of potential predictors of cost exist and the impact that these actually did have on the cost among dementia patients has been described. In the analysis of costs that are attributed to dementia, similar variables were entered into the models to control for their influence. The variables included in the model were:

- Social-demographic characteristics of the participants (gender, age, education, marital status, income of the participants and number of family assets)

- Living arrangements of the participants (general living arrangement, living with children under 16 years old)
- Whether the participant had private health insurance
- Social-demographic factors of carers (gender, age, education, marital status, paid work, relationship to the participants)
- Other mental or physical problems (depression, hypertension, diabetes, ischemic heart disease, stroke, COPD, number of physical impairments causing at least some difficulty)

Two bootstrapped linear regression models were generated for each dependent variable. In the first model, a variable indicating whether dementia was present (yes/no) was entered into the regression model as an independent variable, along with the above variables. In the second model, dummy variables were generated for each severity level of dementia according to CDR criteria (with no dementia as the reference group), and these were entered into the model.

The public level cost perspective was used in these analyses. This was mainly because the public level is broader and has more policy implications. Another reason is that cost estimations are more stable at the public level and there is unlikely to be excessively high costs calculated through sampling error. Furthermore, the cost attributed to dementia identified in this section will be used in section 7 to estimate the cost of dementia at a country level and for this purpose it is more appropriate to consider the cost at the public rather than the private level. Consequently, models were run with five dependent relating to the public level cost of medical care, social care, informal care, total cost at the public level, and the cost of paid home care.

The costs attributable to the presence of dementia and the severity of dementia were calculated for each project country and for the whole sample. Costs attributed to other conditions were presented as well in order to show the differences compared to dementia. These results were based on the first model with a variable indicating whether dementia was present. In the analyses for each country the location of the setting (urban/rural) was (where appropriate) entered into the model as a variable to control for. In the analyses for the whole sample the centre variable was converted to dummy variables (with Cuba as the reference category) and those were also entered

into the model.

Finally, based on the results from the two models, the costs of dementia for each project country were calculated. The process involved in these calculations was as follows:

- The population size of each country and the percentage of the population older than 65 in 2008 was extracted from the World Population Data Sheet from the website of the Population Reference Bureau (http://www.prb.org/publications/datasheets/2008/2008wpds.aspx).
- The prevalence of dementia at each severity level was taken from the 10/66 database.
- The cost per person with dementia and cost at each level of severity (described in Tables 6.1 and 6.2), separated into total cost, medical care, social care (in turn divided into informal care and paid home care) was extracted.
- The product of the population size, proportion aged 65 and over, proportion with each severity level of dementia, and the cost of care for each level was calculated to estimate the total cost of dementia at the country level.

To facilitate an interpretation of the implications that the total costs have and to make relevant comparisons among project countries, the total cost was expressed as an equivalent percentage figure of GDP for each country. Data on GDP per capita for each country in 2008 was obtained from the WHO-CHOICE database (see Table 8.4b), with the figures presented in international dollars. These figures were multiplied by the total population size of each country to generate total GDP. Dividing the total dementia cost by this figure and multiplying by 100 shows the cost of dementia as an equivalent percentage of GDP. The advantage of this method is the figure may be more easily understood by policy makers as indicating the impact that dementia has. However, a limitation here is that GDP does not include all the components which have been included in the dementia costs, particularly the cost of unpaid family care.

Only relevant figures are selected and presented in tables of this section. Results of full models are shown in Appendix (Table A3.1 to A3.16).

## 6.2. Results

### Attributable costs of dementia

The costs that can be attributed to the presence or not of dementia in the seven 10/66 project countries are shown in Table 6.1. All centres clearly have increased mean total costs associated with dementia. In India, dementia is associated with the lowest increase, while participants in Peru have the highest increase. The table also shows that the increase in cost is due to the impact on social care, rather than medical care. With regard to social care, the main cost driver comes from informal care in each country. However, in Cuba, the Dominican Republic, Peru and China the costs for paid care are also increased significantly because of dementia.

**Table 6.1. Mean cost per year attributable to dementia in 2008 international dollars**

| Type of cost | Cuba | Dominican Republic | Peru | Venezuela | Mexico | China | India | Whole sample |
|---|---|---|---|---|---|---|---|---|
| Medical care | -5.5 | -44 | -42 | 296 | 16 | 148 | -29 | 12 |
| Social care | 3856* | 3847* | 10375* | 3201* | 4765* | 8540* | 1793* | 5114* |
| Informal care | 3658* | 3433* | 8870* | 2986* | 4720* | 7344* | 1793* | 4653* |
| Paid home care | 198* | 415* | 1505* | 215 | 45 | 1195* | - | 493* |
| Total cost | 3851* | 3804* | 10332* | 3497* | 4781* | 8687* | 1764* | 5164* |

* Statistically significant at 95% level of confidence

### Attributable costs of dementia severity

The costs attributable to dementia, by level of severity, are shown in Table 6.2. Not having dementia is the reference category. For mild, moderate and severe dementia, the costs for social care and total cost increase with severity. However, this tendency is not detected for cost of medical care. In the Dominican Republic, decreases in medical costs are found for moderate dementia. Interestingly, for the whole sample the presence of questionable and mild dementia seems to increase medical costs compared to not having dementia, and moderate dementia increase as well but without statistical significance, which might be because of large standard errors.

**Table 6.2. Mean attributable cost of dementia by level of severity in 2008 international dollars**

| Type of cost | Cuba | Dominican Republic | Peru | Venezuela | Mexico | China | India | Whole sample |
|---|---|---|---|---|---|---|---|---|
| Medical care | | | | | | | | |
| Questionable and mild | 69 | -15 | 109 | 100 | 71 | -16 | 35 | 49* |
| Moderate | 40 | -136* | -45 | 2084 | -30 | 661 | -109 | 240 |
| Severe | 20 | -46 | -108 | -[1] | 365 | -150 | 308 | -4.8 |
| Social care | | | | | | | | |
| Questionable and mild | 301* | 348* | 1429* | 334* | 450* | 767* | 279* | 612* |
| Moderate | 7269* | 9801* | 17920* | 10105* | 10646* | 15517* | 8612* | 11670* |
| Severe | 9277* | 16662* | 23474* | -[1] | 28139* | 22154* | 12787* | 13868* |
| Informal care | | | | | | | | |
| Questionable and mild | 297* | 291* | 1262* | 313* | 461* | 694* | 279* | 561* |
| Moderate | 6594* | 8649* | 15147* | 9919* | 10356* | 13409* | 8612* | 10404* |
| Severe | 9010* | 14736* | 20920* | -[1] | 26675* | 18590* | 12787* | 12750* |
| Paid home care | | | | | | | | |
| Questionable and mild | 4.4 | 57 | 167* | 21 | -11 | 73 | - | 51* |
| Moderate | 675* | 1152* | 2772* | 185 | 290 | 2108* | - | 1266* |
| Severe | 267* | 1925* | 2553 | -[1] | 1464 | 3564 | - | 1118* |
| Total cost | | | | | | | | |
| Questionable and mild | 370* | 333* | 1538* | 434* | 521* | 750* | 314* | 662* |
| Moderate | 7309* | 9664* | 17875* | 12189* | 10616* | 16179* | 8504* | 11910* |
| Severe | 9297* | 16615* | 23366* | -[1] | 28504* | 22004* | 13095* | 13863* |

* Statistically significant at 95% level of confidence
[1] Results are omitted because dementia cases are too few.

**Costs attributed to other conditions**

Increases in the costs of medical care are found for participants with depression, hypertension, diabetes and stroke in some countries (Table 6.3). Across the whole sample, diabetes and stroke increase medical care costs. Increases in costs for social care and total cost are associated with depression, hypertension, diabetes and stroke in most countries. However, these increases are typically smaller than those observed for dementia. An exception is India, where the increase in costs for social care and total cost associated with for stroke is higher than the cost increase associated with dementia.

Relatively small decreases in costs for social care and total cost are associated with hypertension, ischemic heart disease and COPD in some countries. However, in China there is a significant increase in the cost of social care and total cost associated with for COPD.

**Table 6.3. Mean cost attributable to the presence of different conditions in 2008 international dollars**

| Type of cost | Cuba | DR** | Peru | Venezuela | Mexico | China | India | Whole sample |
|---|---|---|---|---|---|---|---|---|
| Medical care | | | | | | | | |
| Dementia | -5.5 | -44 | -42 | 296 | 16 | 148 | -29 | 12 |
| Depression | 91* | 21 | 92 | 466 | -34 | 36 | -19 | 72 |
| Hypertension | 32 | -35 | 122* | 15 | 65 | -10 | -31 | 23 |
| Diabetes | -1.9 | 58 | 73 | 72 | 102 | 160* | 212* | 102* |
| Ischemic heart disease | 11 | -19 | -47 | 61 | -116 | 75 | 9.0 | -18 |
| Stroke | 4.5 | 94* | 81 | 256 | 237* | 259* | 1066 | 174* |
| COPD | -49 | 43 | 266 | -48 | -94 | -164 | -3.3 | 26 |
| Social care | | | | | | | | |
| Dementia | 3856* | 3847* | 10375* | 3201* | 4765* | 8540* | 1793* | 5114* |
| Depression | 448 | 177 | 1214 | 1737* | 495 | 7624* | 608* | 487* |
| Hypertension | -177* | -5.3 | -115 | 38 | -230 | -396* | -79 | -189* |
| Diabetes | 1.2 | -38 | 536 | 657* | 679* | 616 | 553* | 303* |
| Ischemic heart disease | -265* | 397 | -89 | -276 | 9.8 | -207 | -364 | -211 |
| Stroke | 973* | 1311* | 3461* | 776 | 1819* | 3813* | 2185* | 2085* |
| COPD | -144 | -561* | -720 | -111 | 93 | 2125* | 212 | -34 |
| Informal care | | | | | | | | |
| Dementia | 3658* | 3433* | 8870* | 2986* | 4720* | 7344* | 1793* | 4653* |
| Depression | 406 | 138 | 1301 | 1674* | 439 | 8162* | 608* | 624* |
| Hypertension | -179* | -32 | -119 | 103 | -219 | -269 | -79 | -68 |
| Diabetes | 7.1 | -65 | 411 | 619* | 682* | 416 | 553* | 303* |
| Ischemic heart disease | -231* | 520 | 124 | -246 | -150 | -66 | -364 | -117 |
| Stroke | 853* | 1080* | 3217* | 816 | 1832* | 3070* | 2185* | 1820* |
| COPD | -176 | -449* | -662 | -212 | 106 | 2015* | 212 | 13 |
| Paid home care | | | | | | | | |
| Dementia | 198* | 415* | 1505* | 215 | 45 | 1195* | - | 493* |
| Depression | 43 | 39 | -87 | 63 | 56 | -539 | - | -6.3 |
| Hypertension | 2.0 | 27 | 4.0 | -65 | -10 | -127* | - | -11 |
| Diabetes | -5.9 | 27 | 126 | 38 | -2.2 | 200 | - | 34 |
| Ischemic heart disease | -33* | -123* | -214 | -29 | 159 | -141 | - | -48 |
| Stroke | 120* | 231 | 244 | -41 | -13 | 743* | - | 226* |
| COPD | 32 | -112 | -58 | 100 | -13* | 110 | - | -2.9 |
| Total cost | | | | | | | | |
| Dementia | 3851* | 3804* | 10332* | 3497* | 4781* | 8687* | 1764* | 5164* |
| Depression | 540 | 197 | 1306 | 2203* | 461 | 7660* | 588* | 705* |
| Hypertension | -145 | -40 | 7.0 | 53 | -165 | -406* | -109 | -50 |
| Diabetes | -0.7 | 20 | 610 | 729* | 781* | 776* | 764* | 420* |
| Ischemic heart disease | -253* | 378 | -136 | -215 | -106 | -132 | -355 | -158 |
| Stroke | 977* | 1405* | 3542* | 1032 | 2056* | 4072* | 3251* | 2218* |
| COPD | -193 | -518 | -454 | -159 | -1.6 | 1961* | 209 | 18 |

* Statistically significant at 95% level of confidence
** DR: Dominican Republic

**Attributable costs of dementia at the country level**

Population information, GDP per capita in 2008, prevalence of dementia, and total

costs of dementia for each type of care in 2008 at the country level are shown in Table 6.4. Cost for medical care is much lower compared with cost of social care in every country. Informal care is the main component of social care costs. The total cost is obviously largely influenced by population size (China has the highest total cost and figure and the Dominican Republic the lowest). The attributable costs of dementia are equivalent to between 0.1% and 1.2% of GDP in the project countries. This suggests that dementia has the biggest impact in Cuba and has the least impact in Venezuela.

**Table 6.4. Total attributable cost of dementia in 2008 international dollars at the country level**

| Items | Cuba | Dominican Republic | Peru | Venezuela | Mexico | China | India |
|---|---|---|---|---|---|---|---|
| Population in 2008 (millions) | 11.2 | 9.9 | 27.9 | 27.9 | 107.7 | 1324.7 | 1149.3 |
| % of population aged 65+ | 12% | 6% | 6% | 5% | 6% | 8% | 5% |
| GDP per capita in 2008 (I$) | 4125 | 8138 | 8522 | 12665 | 14494 | 6136 | 2925 |
| Prevalence of dementia | 11.0% | 12.0% | 8.6% | 7.4% | 9.0% | 6.5% | 9.1% |
| Annual cost of care (I$ millions) | | | | | | | |
| Medical care | -1 | -3 | -6 | 31 | 9 | 1019 | -152 |
| Social care | 570 | 274 | 1494 | 330 | 2771 | 58827 | 9376 |
| Informal care | 541 | 245 | 1277 | 308 | 2745 | 50589 | 9376 |
| Paid home care | 29 | 30 | 217 | 22 | 26 | 8232 | - |
| Total cost (I$millions) | 569 | 271 | 1487 | 361 | 2781 | 59840 | 9225 |
| Total cost as % of GDP | 1.2% | 0.3% | 0.6% | 0.1% | 0.2% | 0.7% | 0.3% |

The prevalence of dementia at each severity level of dementia and the costs attributable to dementia severity for each type of care are shown in Table 6.5. The average attributable cost is higher for moderate or severe dementia, but the total cost at the country level is lower because of the low prevalence. At the country level, the costs for medical care for people with moderate or severe dementia are lower than the costs for people with mild dementia, except in the Dominican Republic, Venezuela and China. The cost for social care is the lowest for severe dementia patients in Peru, Mexico, China and India. Similar tendencies can be found for total cost.

**Table 6.5. Total attributable cost of dementia by severity level in 2008 international dollars at the country level**

| Items | Cuba | Dominican Republic | Peru | Venezuela | Mexico | China | India |
|---|---|---|---|---|---|---|---|
| Prevalence from 10/66 study | | | | | | | |
| Mild | 5.5% | 9.0% | 5.9% | 4.8% | 6.1% | 3.6% | 4.8% |
| Moderate | 2.4% | 2.3% | 1.9% | 1.9% | 1.0% | 1.9% | 0.6% |
| Severe | 1.8% | 1.1% | 0.7% | 0.2% | 0.1% | 0.1% | 0.1% |
| Annual cost of care (I$ millions) | | | | | | | |
| Medical care | | | | | | | |
| Mild | 2.9 | -3.7 | 12 | -4.7 | 49 | -53 | 764 |
| Moderate | 1.2 | -1.9 | -1.4 | 55 | -1.7 | 1333 | -34 |
| Severe | 0.4 | -0.3 | -1.3 | - | 2.4 | -16 | 18 |
| Social care | | | | | | | |
| Mild | 148 | 93 | 609 | 117 | 1578 | 24047 | 5164 |
| Moderate | 239 | 136 | 580 | 270 | 708 | 32557 | 2990 |
| Severe | 227 | 109 | 278 | - | 182 | 2394 | 735 |
| Informal care | | | | | | | |
| Mild | 142 | 77 | 512 | 110 | 1582 | 19968 | 5164 |
| Moderate | 217 | 120 | 490 | 265 | 689 | 28075 | 2990 |
| Severe | 221 | 97 | 248 | - | 173 | 2008 | 735 |
| Paid home care | | | | | | | |
| Mild | 7 | 16 | 97 | 7 | -5 | 4075 | - |
| Moderate | 22 | 16 | 90 | 5 | 19 | 4482 | - |
| Severe | 7 | 13 | 30 | - | 9 | 386 | - |
| Total cost | | | | | | | |
| Mild | 151 | 89 | 621 | 113 | 1627 | 23990 | 5930 |
| Total cost as % of GDP | 0.3% | 0.1% | 0.3% | 0.03% | 0.1% | 0.3% | 0.2% |
| Moderate | 240 | 134 | 579 | 325 | 706 | 33888 | 2955 |
| Total cost as % of GDP | 0.5% | 0.2% | 0.2% | 0.09% | 0.05% | 0.4% | 0.09% |
| Severe | 228 | 109 | 277 | | 185 | 2378 | 752 |
| Total cost as % of GDP | 0.5% | 0.1% | 0.1% | | 0.01% | 0.03% | 0.02% |

**Summary of section**

This section has reported provided information on the costs that can be attributed specifically to dementia and these costs were compared with other chronic diseases. Costs attributable to different severity levels were also reported. The results show that all countries have significant increases in cost for those with dementia. The increase in cost is due to the impact on social care (particularly informal care), rather than medical care. The attributable costs increase with progression of the disease, but only for social care and total cost, not for medical care. Dementia clearly has a

higher attributable cost than that of any other chronic diseases measured except in India, but again only for social care and total cost, not for medical care. In India, stroke has the highest attributable cost, and dementia was the second.

Total cost at country level is largely influenced by population size. The attributable costs of dementia are equivalent to between 0.1% and 1.2% of GDP in the project countries. Although the average cost is higher for moderate or severe dementia, the total cost in a country is lower for these severity levels because of the lower prevalence.

# Section 7. Sensitivity analyses

The calculation of costs described in previous sections required assumptions to be made about the unit costs of services (including carer time) to be used. In this section, sensitivity analyses are carried out to see the impact of making different assumptions about these unit costs. As stated in Section 3, for both medical care and social care there are alternative costing methods that can be considered; for medical care the two alternative methods are the 'percentage method' and the 'GDP-ratio method', while for social care the five alternative methods are the '10/66 salary method', 'replacement cost approach', 'leisure time method', 'carers characteristics method' and 'all informal care method'.

All of the sensitivity analyses are performed from the public level perspective. The costs that have already been calculated (described in Sections 3 and 4) are termed the 'base-case' in this section. The basis for the estimation of the cost for medical care was the UK unit cost method, while for social care costs were based on average earnings from the ILO. The results from the base-case analysis will be compared with results using the alternative methods both for the whole sample and for participants with dementia.

## 7.1. Percentage method

The 'percentage method' assumes that an individual has the same percentage of out of pocket expenditure on total health expenditure as summarised at the country level, and out-of-pocket expenditure information collected from the survey is used to generate the total cost. However, this approach is only applied for calculating the total costs of primary health centre care, hospital doctors, other government health workers and admission to hospital. The costs for other types of medical care, including private doctors, dentists and traditional healers remains based entirely on out of pocket spending because these are unlikely to be subsidised (at least not to any great extent).

WHO has released a global health expenditure database over the past ten years. The

database provides internationally comparable numbers on national health expenditures. The information is based on publicly available reports, including national health account reports, reports from the Ministry of Finance, Central Bank, National Statistics Offices, public expenditure information and reports from the World Bank and the International Monetary Fund. Estimates in the database are taken and adjusted from these resources and are updated every year. The database includes health expenditure indicators, health expenditure data, macroeconomic data and WHO Global Health Observatory (GHO) indicators.

For these analyses, the relevant information includes:

- Total health expenditure (THE) as a percentage of GDP.
- General government expenditure on health (GGHE) as a percentage of THE.
- Private expenditure on health (PvtHE) as a percentage of THE.
- Out of pocket expenditure as a percentage of PvtHE.
- Out of pocket expenditure as a percentage of THE, which is used to determine which country has the largest proportional out of pocket expenditure. Estimates of this indicator in the database are not available for all of the countries. For those without the estimation (Cuba, the Dominican Republic, Mexico, Peru and Venezuela), a formula is used to calculate the indicator.

Out of pocket expenditure as a percentage of THE = PvtHE as a percentage of THE × out of pocket expenditure as a percentage of PvtHE

The above data for the countries in different years is shown in Table 7.1. Data for 2010 is not available for Mexico. From the table, it is seen that among all the countries, India has (proportionally) the lowest government expenditure on health but the highest private expenditure on health and the largest proportional out of pocket expenditure on healthcare. Cuba has the largest percentage of government expenditure, but the lowest private expenditure on health and the smallest out of pocket expenditure as a percentage of total health expenditure. Cuba has seen a big increase in total health expenditure over time. The percentage of out-of-pocket expenditure as a percentage of total health expenditure decreased from 2002 to 2009/10 in most counties, but not in Peru and Venezuela.

**Table 7.1. Health expenditure in project countries (2002-2010)**

| Indicators | Countries | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|---|---|---|---|
| Total health expenditure (THE) as percentage of (GDP) | China | 5 | 5 | 5 | 5 | 5 | 4 | 5 | 5 | 5 |
| | Cuba | 6 | 6 | 6 | 8 | 8 | 10 | 11 | 12 | 11 |
| | Dominican Republic | 6 | 6 | 5 | 5 | 6 | 5 | 6 | 6 | 6 |
| | India | 5 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 |
| | Mexico | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | - |
| | Peru | 5 | 5 | 4 | 4 | 5 | 5 | 6 | 5 | 5 |
| | Venezuela | 6 | 6 | 6 | 5 | 6 | 6 | 5 | 6 | 5 |
| General government expenditure on health (GGHE) as percentage of THE | China | 36 | 36 | 38 | 39 | 41 | 47 | 50 | 52 | 54 |
| | Cuba | 88 | 89 | 90 | 93 | 93 | 95 | 95 | 93 | 91 |
| | Dominican Republic | 32 | 33 | 29 | 32 | 37 | 36 | 37 | 41 | 43 |
| | India | 23 | 23 | 23 | 24 | 25 | 26 | 28 | 30 | 29 |
| | Mexico | 44 | 44 | 45 | 45 | 45 | 45 | 47 | 48 | - |
| | Peru | 58 | 59 | 59 | 59 | 56 | 59 | 62 | 58 | 54 |
| | Venezuela | 39 | 38 | 41 | 43 | 42 | 47 | 45 | 40 | 35 |
| Private expenditure on health (PvtHE) as percentage of THE | China | 64 | 64 | 62 | 61 | 59 | 53 | 50 | 48 | 46 |
| | Cuba | 12 | 11 | 10 | 7 | 7 | 5 | 5 | 7 | 9 |
| | Dominican Republic | 68 | 67 | 71 | 68 | 63 | 64 | 63 | 59 | 57 |
| | India | 77 | 77 | 77 | 76 | 75 | 74 | 72 | 70 | 71 |
| | Mexico | 56 | 56 | 55 | 55 | 55 | 55 | 53 | 52 | - |
| | Peru | 42 | 41 | 41 | 41 | 44 | 41 | 38 | 42 | 46 |
| | Venezuela | 61 | 62 | 59 | 57 | 58 | 53 | 55 | 60 | 65 |
| Out of pocket expenditure as percentage of PvtHE | China | 90 | 88 | 86 | 85 | 83 | 83 | 81 | 79 | 79 |
| | Cuba | 100 | 100 | 93 | 100 | 100 | 100 | 100 | 100 | 100 |
| | Dominican Republic | 71 | 70 | 69 | 67 | 64 | 65 | 66 | 66 | 66 |
| | India | 92 | 92 | 89 | 90 | 89 | 88 | 87 | 86 | 86 |
| | Mexico | 95 | 95 | 95 | 94 | 94 | 93 | 93 | 92 | - |
| | Peru | 82 | 79 | 79 | 79 | 82 | 85 | 87 | 85 | 86 |
| | Venezuela | 93 | 93 | 91 | 89 | 88 | 88 | 90 | 91 | 91 |
| Out of pocket expenditure as percentage of THE | China | 58 | 56 | 54 | 52 | 49 | 44 | 40 | 37 | 37 |
| | Cuba* | 12 | 11 | 9 | 7 | 7 | 5 | 5 | 7 | 9 |
| | Dominican Republic* | 48 | 47 | 49 | 46 | 41 | 42 | 42 | 39 | 37 |
| | India | 71 | 71 | 69 | 68 | 67 | 65 | 63 | 60 | 61 |
| | Mexico* | 53 | 53 | 52 | 52 | 51 | 51 | 49 | 48 | - |
| | Peru* | 35 | 33 | 33 | 32 | 36 | 35 | 33 | 36 | 39 |
| | Venezuela * | 56 | 57 | 53 | 51 | 51 | 47 | 49 | 54 | 59 |

Source: WHO Global Health Expenditure Database
http://apps.who.int/nha/database/DataExplorerRegime.aspx
* Not available from the database; figures calculated according to the formula in the text.

The out-of-pocket costs for different services have been described in Table 4.9. The percentage of out of pocket expenditure on total health expenditure at the country level has been obtained (or derived) from the WHO Global Health Expenditure Database for each project country and these figures have been used to 'uplift' the out of pocket expenditures to reflect total costs.

Data from Table 7.1 that were specific to the interview year in each country were

used (see Table 7.2).

**Table 7.2. Out of pocket expenditure as percentage of total health expenditure for project countries**

| Items | China | Cuba | Dominican Republic | India | Mexico | Peru | Venezuela |
|---|---|---|---|---|---|---|---|
| Interview year | 2004 | 2004 | 2005 | 2004 | 2006 | 2005 | 2005 |
| Percentage of total health expenditure | 54% | 9% | 46% | 69% | 51% | 32% | 51% |

The comparison between costs estimated using the percentage method and the base-case estimates are shown in Table 7.3a for the whole sample and Table 7.3b for participants with dementia.

For the whole sample, using the percentage method substantially changes the direct medical cost and cost for medical care, except in urban Mexico and rural India. Across all countries the total cost increases 38% using the percentage method. The largest proportional difference is for urban China (188%), while in Cuba, Peru, urban Mexico and rural India the proportional differences are less than 10%. In most countries, the tendency is to increase the cost. However, in the Dominican Republic and rural Peru use of the percentage method serves to decrease total cost.

Among participants with dementia, although use of the percentage method again substantially changes the cost of medical care, the change in total cost across all countries is only 8.5%. The change in urban China is still the largest but is reduced to about 40%. This is because participants with dementia use relatively less medical care, and it is the latter that is mostly affected by the percentage method.

**Table 7.3a. Total cost of health services in 2008 international dollar among all participants using the percentage method, by site**

| Type of Cost | Method | Cuba | Dominican Republic | Peru (urban) | Peru (rural) | Venezuela | Mexico (urban) | Mexico (rural) | China (urban) | China (rural) | India (urban) | India (rural) | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Direct medical costs | Percentage method | 122±329 | 22±98 | 402±4803 | 49±398 | 1022±8685 | 441±2532 | 526±6931 | 4511±15324 | 232±2151 | 92±745 | 65±1120 | 638±5961 |
| | Base-case | 96±212 | 159±488 | 312±1556 | 104±475 | 372±1376 | 441±1201 | 273±766 | 211±777 | 23±255 | 24±164 | 63±850 | 192±879 |
| Total cost of health services | Percentage method | 160±986 | 32±112 | 444±4820 | 70±415 | 1061±8702 | 479±2539 | 568±6949 | 4526±15343 | 233±2153 | 104±757 | 78±1136 | 665±5986 |
| | Base-case | 134±960 | 169±502 | 354±1579 | 124±505 | 411±1415 | 478±1226 | 315±814 | 226±789 | 25±258 | 35±180 | 77±865 | 219±991 |
| Total costs | Percentage method | 747±2663 | 959±3670 | 2327±8418 | 934±4874 | 2084±9892 | 1718±5427 | 1376±8118 | 6588±17092 | 696±3526 | 427±2574 | 644±2429 | 1629±7506 |
| | Base-case | 721±2649 | 1096±3702 | 2238±7111 | 988±4895 | 1434±4824 | 1718±4997 | 1124±4365 | 2289±6342 | 488±2736 | 359±2465 | 642±2291 | 1183±4408 |
| | Difference | 3.6% | -13% | 4.0% | -5.5% | 45% | 0% | 22% | 188% | 43% | 19% | 0% | 38% |

**Table 7.3b. Total cost of health services in 2008 international dollars among participants with dementia using the percentage method, by site**

| Type of Cost | Method | Cuba | Dominican Republic | Peru (urban) | Peru (rural) | Venezuela | Mexico (urban) | Mexico (rural) | China (urban) | China (rural) | India (urban) | India (rural) | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Direct medical costs | Percentage method | 122±242 | 24±84 | 151±735 | 36±97 | 2106±14856 | 249±446 | 380±1638 | 7568±19818 | 341±1113 | 96±609 | 29±68 | 793±7098 |
| | Base-case | 91±201 | 156±366 | 143±331 | 112±204 | 571±2963 | 278±452 | 459±1619 | 608±2052 | 24±75 | 35±166 | 47±109 | 216±1197 |
| Total cost of health services | Percentage method | 145±265 | 36±98 | 176±758 | 72±142 | 2157±14885 | 285±468 | 429±1659 | 7604±19863 | 345±1122 | 118±693 | 49±96 | 819±7115 |
| | Base-case | 114±254 | 168±385 | 167±368 | 148±256 | 622±3008 | 313±488 | 508±1641 | 643±2061 | 27±88 | 57±208 | 67±142 | 243±1219 |
| Total costs | Percentage method | 4545± 5617 | 5246±8360 | 14035± 15642 | 6440± 11394 | 9954±18363 | 7705± 10678 | 4846±9370 | 22854±23859 | 6313±9228 | 2976± 6958 | 2144± 3623 | 7327± 12699 |
| | Base-case | 4514± 5593 | 5378±8354 | 14026± 15641 | 6516± 11376 | 8419±11769 | 7733± 10736 | 4925±9539 | 15894±11615 | 5995±8951 | 2915± 6902 | 2162± 3640 | 6750± 10154 |
| | Difference | 0.7% | -2.5% | 0.1% | -1.2% | 18.2% | -0.4% | -1.6% | 43.8% | 5.3% | 2.1% | -0.8% | 8.5% |

## 7.2. GDP ratio method

According to the World Bank (The World Bank), 'GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products.' GDP per capita is gross domestic product divided by midyear population.

Information regarding GDP per capita can be found in a number of databases, although there are some small differences between them. GDP per capita data provided by the World Bank from 2002 to 2010 are shown in Table 7.4a. All these figures are in current U.S. dollars. Data are not available for Cuba in the year of 2009 and 2010.

**Table 7.4a. GDP per capita from the World Bank (2002-2010)**

| Country | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|---|---|---|
| China | 1,135 | 1,274 | 1,490 | 1,731 | 2,069 | 2,651 | 3,414 | 3,749 | 4,428 |
| Cuba | 3,006 | 3,203 | 3,400 | 3,789 | 4,682 | 5,201 | 5,565 | - | - |
| Dominican Republic | 2,999 | 2,364 | 2,414 | 3,670 | 3,825 | 4,334 | 4,739 | 4,776 | 5,215 |
| India | 484 | 563 | 668 | 762 | 857 | 1,105 | 1,067 | 1,192 | 1,475 |
| Mexico | 6,324 | 6,740 | 7,224 | 7,973 | 8,831 | 9,485 | 9,893 | 7,852 | 9,123 |
| Peru | 2,136 | 2,279 | 2,559 | 2,881 | 3,312 | 3,807 | 4,456 | 4,412 | 5,401 |
| Venezuela | 3,683 | 3,257 | 4,304 | 5,475 | 6,788 | 8,243 | 11,138 | 11,490 | 13,590 |

Data are in current U.S. dollars.
Source:World bank
http://data.worldbank.org/indicator/NY.GDP.PCAP.CD/countries?display=default

Information on GDP per capita provided by WHO-CHOICE for the years 2007 and 2008 is shown in Table 7.4b. These data are available in local currency units (LCU) and international Dollar (I$).

**Table 7.4b. GDP per capita in WHO-CHOICE database (2007-2008)**

| Year | Country | China | Cuba | Dominican Republic | India | Mexico | Peru | Venezuela |
|---|---|---|---|---|---|---|---|---|
| 2007 | GDP per capita in LCU | 19,999 | 5,230 | 139,011 | 42,483 | 105,658 | 11,798 | 17,587 |
| | GDP per capita in I$ | 5,517 | 3,844 | 7,679 | 2,764 | 14,107 | 7,691 | 12,036 |
| 2008 | GDP per capita in LCU | 23,482 | 5,596 | 158,411 | 47,185 | 113,343 | 13,100 | 23,755 |
| | GDP per capita in I$ | 6,136 | 4,125 | 8,138 | 2,925 | 14,494 | 8,522 | 12,665 |

Source: WHO-CHOICE http://www.who.int/choice/country/country_specific/en/index.htm

The WHO Global Health Expenditure Database also provides information on GDP per capita. Data from 2002 to 2010 are shown in Table 7.4c. Figures are available in current national currency units (NCU), current US dollars and constant US dollars for the year 2005.

**Table 7.4c. GDP per capita from WHO Global Health Expenditure Database (2002-2010)**

| Countries | Unit | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|---|---|---|---|
| China | In current NCU | 9,305 | 10,442 | 12,225 | 14,065 | 16,364 | 20,003 | 23,511 | 25,394 | 29,504 |
| | In current US$ | 1,124 | 1,262 | 1,477 | 1,716 | 2,052 | 2,629 | 3,383 | 3,718 | 4,358 |
| | In constant (2005) US$ | 1,295 | 1,419 | 1,552 | 1,716 | 1,922 | 2,190 | 2,391 | 2,591 | 2,852 |
| Cuba | In current NCU | 2,999 | 3,197 | 3,398 | 3,793 | 4,692 | 5,215 | 5,412 | 5,541 | 5,713 |
| | In current US$ | 2,999 | 3,197 | 3,398 | 3,793 | 4,692 | 5,632 | 5,412 | 5,541 | 5,713 |
| | In constant (2005) US$ | 3,119 | 3,229 | 3,411 | 3,793 | 4,252 | 4,563 | 4,750 | 4,818 | 4,916 |
| Dominican Republic | In current NCU | 52,323 | 68,701 | 99,566 | 110,101 | 126,598 | 143,120 | 163,080 | 171,357 | 191,582 |
| | In current US$ | 2,812 | 2,228 | 2,364 | 3,621 | 3,794 | 4,303 | 4,710 | 4,756 | 5,195 |
| | In constant (2005) US$ | 3,428 | 3,369 | 3,362 | 3,621 | 3,950 | 4,225 | 4,384 | 4,476 | 4,759 |
| India | In current NCU | 22,546 | 24,909 | 28,845 | 32,512 | 37,025 | 42,146 | 46,810 | 51,594 | 61,178 |
| | In current US$ | 464 | 535 | 637 | 737 | 817 | 1,019 | 1,076 | 1,066 | 1,338 |
| | In constant (2005) US$ | 600 | 640 | 681 | 737 | 789 | 849 | 884 | 906 | 972 |
| Mexico | In current NCU | 68,045 | 74,077 | 83,118 | 88,705 | 98,661 | 105,658 | 113,343 | 109,571 | 120,632 |
| | In current US$ | 7,044 | 6,865 | 7,362 | 8,138 | 9,051 | 9,667 | 10,184 | 8,110 | 9,547 |
| | In constant (2005) US$ | 8,467 | 7,749 | 7,972 | 8,138 | 8,464 | 8,677 | 8,728 | 8,091 | 8,497 |
| Peru | In current NCU | 7,511 | 7,929 | 8,733 | 9,494 | 10,847 | 11,913 | 13,037 | 13,291 | 14,947 |
| | In current US$ | 2,136 | 2,279 | 2,559 | 2,881 | 3,313 | 3,808 | 4,459 | 4,413 | 5,291 |
| | In constant (2005) US$ | 2,560 | 2,630 | 2,728 | 2,881 | 3,069 | 3,298 | 3,527 | 3,591 | 3,859 |
| Venezuela | In current NCU | 4,267 | 5,215 | 8,118 | 11,404 | 14,521 | 17,627 | 23,808 | 24,552 | 34,913 |
| | In current US$ | 3,675 | 3,245 | 4,293 | 5,457 | 6,763 | 8,210 | 11,089 | 11,435 | 13,522 |
| | In constant (2005) US$ | 4,781 | 4,333 | 5,033 | 5,457 | 5,892 | 6,195 | 6,457 | 6,143 | 5,969 |

Source: WHO Global Health Expenditure Database
http://apps.who.int/nha/database/DataExplorerRegime.aspx

The World Economic Outlook Database produced by the IMF provides information on GDP per capita for most countries. However, data are not available for Cuba. As

shown in Table 7.4d, GDP per capita are presented in constant NCUs, current NCUs, current US dollars and current International dollars, based on PPP, for the years 2002 to 2011.

**Table 7.4d. GDP per capita from IMF World Economic Outlook Database (2002-2010)**

| Country | Units | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|---|---|---|---|
| China | Constant NCU | 4,798 | 5,246 | 5,742 | 6,353 | 7,122 | 8,092 | 8,823 | 9,588 | 10,526 |
| | Current NCU | 9,368 | 10,510 | 12,299 | 14,144 | 16,456 | 20,117 | 23,648 | 25,541 | 29,669 |
| | Current US $ | 1,132 | 1,270 | 1,486 | 1,726 | 2,064 | 2,645 | 3,404 | 3,739 | 4,382 |
| | Current I$ | 2,882 | 3,217 | 3,614 | 4,102 | 4,748 | 5,550 | 6,187 | 6,794 | 7,544 |
| Dominican Republic | Constant NCU | 27,718 | 27,159 | 27,029 | 29,011 | 31,540 | 33,609 | 34,750 | 35,308 | 37,371 |
| | Current NCU | 54,146 | 70,899 | 102,447 | 112,922 | 129,394 | 145,741 | 165,411 | 173,032 | 192,554 |
| | Current US $ | 2,911 | 2,315 | 2,430 | 3,712 | 3,879 | 4,379 | 4,777 | 4,815 | 5,227 |
| | Current I$ | 5,805 | 5,808 | 5,686 | 6,197 | 6,955 | 7,626 | 8,060 | 8,275 | 8,860 |
| India | Constant NCU | 25,957 | 27,317 | 28,934 | 31,071 | 33,549 | 36,384 | 38,101 | 40,126 | 43,563 |
| | Current NCU | 23,409 | 25,578 | 28,549 | 32,128 | 36,554 | 41,748 | 47,038 | 52,163 | 63,100 |
| | Current US $ | 481 | 549 | 630 | 729 | 807 | 1,009 | 1,081 | 1,077 | 1,371 |
| | Current I$ | 1,673 | 1,798 | 1,973 | 2,190 | 2,441 | 2,724 | 2,916 | 3,104 | 3,408 |
| Mexico | Constant NCU | 73,877 | 74,094 | 76,331 | 78,046 | 81,354 | 83,247 | 83,531 | 77,753 | 81,152 |
| | Current NCU | 67,502 | 74,063 | 83,223 | 88,961 | 98,928 | 106,940 | 114,130 | 110,463 | 120,316 |
| | Current US $ | 6,991 | 6,865 | 7,374 | 8,163 | 9,077 | 9,786 | 10,255 | 8,174 | 9,522 |
| | Current I$ | 10,875 | 11,136 | 11,959 | 12,483 | 13,432 | 14,143 | 14,506 | 13,645 | 14,406 |
| Peru | Constant NCU | 4,901 | 5,022 | 5,191 | 5,461 | 5,794 | 6,180 | 6,683 | 6,637 | 7,111 |
| | Current NCU | 7,681 | 8,086 | 8,876 | 9,613 | 10,935 | 11,889 | 12,949 | 13,138 | 14,707 |
| | Current US $ | 2,184 | 2,324 | 2,600 | 2,916 | 3,339 | 3,800 | 4,425 | 4,361 | 5,205 |
| | Current I$ | 5,376 | 5,624 | 5,998 | 6,475 | 7,092 | 7,784 | 8,603 | 8,635 | 9,358 |
| Venezuela | Constant NCU | 1,552 | 1,404 | 1,628 | 1,760 | 1,896 | 2,021 | 2,086 | 1,980 | 1,912 |
| | Current NCU | 4,329 | 5,285 | 8,209 | 11,505 | 14,612 | 17,686 | 23,815 | 24,473 | 34,670 |
| | Current US $ | 3,729 | 3,285 | 4,354 | 5,453 | 6,796 | 8,226 | 11,077 | 11,383 | 10,049 |
| | Current I$ | 8,120 | 7,500 | 8,925 | 9,992 | 11,110 | 12,189 | 12,860 | 12,333 | 12,048 |

Source: International Monetary Fund, World Economic Outlook Database, September 2011
http://www.imf.org/external/pubs/ft/weo/2011/02/weodata/index.aspx

There are, therefore, several sources for data on GDP per capita. The IMF World Economic Outlook Database provides data in constant NCUs, current NCUs, current

US $s and current I$s. However, there are no figures for Cuba. The World Bank provides GDP per capita in current US $s, but with no data available for Cuba for 2009 and 2010. WHO-CHOICE is the only database which provides information in I$s, but with data only available for 2007 and 2008. Data from the Global Health Expenditure Database are quite similar to those from WHO-CHOICE for 2007 and 2008. Although the Global Health Expenditure Database does not provide PPP-based estimates, I$s can be calculated according to PPP exchange rates.

Considering that cost is presented in 2008 figures, the GDP data in I$s from the WHO-CHOICE database was appropriate to use. There is only one ratio between each country and the UK for outpatient and inpatient services (see Table 7.5). Interestingly, the ratios generated according to GDP are quite similar to the average ratios for outpatient and inpatient services from the former table (Table 3.11b).

**Table 7.5. Ratio between the project country cost and UK costs based on GDP method and WHO-CHOICE method**

| Countries to UK | Health services, from GDP | Average ratios of outpatient service and inpatient service , from WHO-CHOICE |
|---|---|---|
| China | 0.165 | 0.164 |
| Cuba | 0.111 | 0.111 |
| Dominican Republic | 0.219 | 0.274 |
| India | 0.079 | 0.080 |
| Mexico | 0.390 | 0.385 |
| Peru | 0.230 | 0.227 |
| Venezuela | 0.341 | 0.336 |

The ratios in Table 7.5 were applied to UK unit costs to generate unit costs specific to each country specific figures as shown in Table 7.6.

**Table 7.6. PPP based unit costs of health and social care services in 2008 international dollars based on ratios generated from GDP method**

| Service types | China | Cuba | Dominican Republic | India | Mexico | Peru | Venezuela |
|---|---|---|---|---|---|---|---|
| Government Primary care, I$ per minute | 0.28 | 0.19 | 0.37 | 0.13 | 0.66 | 0.39 | 0.58 |
| Government hospital doctor I$ per minute | 0.79 | 0.53 | 1.05 | 0.38 | 1.87 | 1.10 | 1.64 |
| Prescriptions, I$ per prescription | 4.32 | 2.91 | 5.74 | 2.07 | 10.22 | 6.03 | 8.93 |
| Other government health worker, I$ per minute in clinic | 0.10 | 0.07 | 0.13 | 0.05 | 0.23 | 0.14 | 0.20 |
| Hospital services, I$ per bed day | 39.12 | 26.32 | 51.92 | 18.73 | 92.47 | 54.53 | 80.85 |

The comparison between costs based on the GDP ratio method and the base-case estimates are shown in Table 7.7a for the whole sample and Table 7.7b for participants with dementia. Compared with results from the base-case analysis, the costs do not differ substantially when the alternative GDP ratio method is used, for the whole sample and individual countries (Table 7.7a). The overall difference in costs is only 1.2%, and this varies between 0% in rural China to 4.2% in the Dominican Republic. For participants with dementia patients, the differences are even smaller (Table 7.7b). This is because the ratios from the WHO-CHOICE database are similar to the ratios based on GDP (see Table 7.5).

## 7.3. 10/66 salary method

The average income for participants' occupations recorded in the 10/66 study could be calculated in every country. Only carers with full-time paid work were considered in these analyses as there was no information about the hours of work for part-time workers. The average income calculated for each country, based on the distribution of job types, is shown in Table 7.8. This average income for each occupation type was used as the unit cost for activities performed by carers of working age. For those carers not of working age, or with missing data, average income was applied.

When the 10/66 salary method was used the cost of help with ADL, IADL and supervision were affected as were total informal care costs, total social care costs and total care costs. Comparisons between findings based on the 10/66 salary method and the base-case estimates are shown in Table 7.9a for the whole sample and Table 7.9b for participants with dementia.

For the whole sample, the 10/66 salary method substantially decreased the cost in each category compared to the base-case estimation. The difference ranged from 19% in Cuba to 79% in urban India. For participants with dementia the differences were greater, which is because most of the costs in these cases were related to informal care.

Table 7.7a. **Total cost of health services in 2008 international dollars among all participants using the GDP ratio method, by site**

| Type of cost | Method | Cuba | Dominican Republic | Peru (urban) | Peru (rural) | Venezuela | Mexico (urban) | Mexico (rural) | China (urban) | China (rural) | India (urban) | India (rural) | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Direct medical costs | GDP ratio method | 82±227 | 113±458 | 297±1566 | 94±482 | 361±1397 | 420±1226 | 258±767 | 219±1037 | 24±271 | 25±178 | 58±859 | 178±907 |
| | Base-case | 96±212 | 159±488 | 312±1556 | 104±475 | 372±1376 | 441±1201 | 273±766 | 211±777 | 23±255 | 24±164 | 63±850 | 192±879 |
| Total cost of health services | GDP ratio method | 120±963 | 123±468 | 339±1588 | 114±508 | 400±1435 | 457±1250 | 300±813 | 234±1046 | 25±274 | 36±194 | 72±874 | 205±1016 |
| | Base-case | 134±960 | 169±502 | 354±1579 | 124±505 | 411±1415 | 478±1226 | 315±814 | 226±789 | 25±258 | 35±180 | 77±865 | 219±991 |
| Total cost | GDP ratio method | 707± 2650 | 1050± 3702 | 2222± 7115 | 978± 4891 | 1422±4838 | 1697± 5004 | 1108± 4374 | 2297± 6413 | 488±2736 | 360± 2468 | 637± 2293 | 1169± 4420 |
| | Base-case | 721± 2649 | 1096± 3702 | 2238± 7111 | 988± 4895 | 1434±4824 | 1718± 4997 | 1124± 4365 | 2289± 6342 | 488±2736 | 359± 2465 | 642± 2291 | 1183± 4408 |
| | Difference | -1.9% | -4.2% | -0.7% | -1.0% | -0.8% | -1.2% | -1.4% | 0.3% | 0.0% | 0.3% | -0.8% | -1.2% |

Table 7.7b. **Total cost of health services in 2008 international dollars among participants with dementia using the GDP ratio method, by site**

| Type of Cost | Method | Cuba | Dominican Republic | Peru (urban) | Peru (rural) | Venezuela | Mexico (urban) | Mexico (rural) | China (urban) | China (rural) | India (urban) | India (rural) | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Direct medical costs | GDP ratio method | 78±217 | 109±300 | 133±353 | 93±168 | 563±2996 | 252±410 | 445±1622 | 758±2844 | 18±59 | 47±267 | 39±88 | 209±1301 |
| | Base-case | 91±201 | 156±366 | 143±331 | 112±204 | 571±2963 | 278±452 | 459±1619 | 608±2052 | 24±75 | 35±166 | 47±109 | 216±1197 |
| Total cost of health services | GDP ratio method | 101±260 | 121±314 | 158±387 | 129±220 | 614±3042 | 288±445 | 493±1644 | 793±2849 | 22±72 | 68±298 | 59±120 | 236±1320 |
| | Base-case | 114±254 | 168±385 | 167±368 | 148±256 | 622±3008 | 313±488 | 508±1641 | 643±2061 | 27±88 | 57±208 | 67±142 | 243±1219 |
| Total cost | GDP ratio method | 4501± 5594 | 5331± 8364 | 14016± 15636 | 6497± 11380 | 8412± 11812 | 7708± 10729 | 4911± 9530 | 16044± 11774 | 5990± 8947 | 2926± 6908 | 2154± 3630 | 6743± 10179 |
| | Base-case | 4514± 5593 | 5378± 8354 | 14026± 15641 | 6516± 11376 | 8419± 11769 | 7733± 10736 | 4925± 9539 | 15894± 11615 | 5995± 8951 | 2915± 6902 | 2162± 3640 | 6750± 10154 |
| | Difference | -0.3% | -0.9% | -0.1% | -0.3% | -0.1% | -0.3% | -0.3% | 0.9% | -0.1% | 0.4% | -0.4% | -0.1% |

**Table 7.8. Average income per month recorded in 10/66 study, in 2008 international dollars**

| Occupation | Cuba | | China | | Dominica Republic[1] | | India | | Mexico | | Peru | | Venezuela | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Average income | Reported number | Average income | Reported number | Average income | Reported number | Average income | Reported number | Average income | Reported number | Average income | Reported number | Average income | Reported number |
| Manager/administrator | 244 | 65 | 427 | 57 | 262 | 8 | 49 | 8 | 462 | 18 | 168 | 63 | 321 | 18 |
| Professional | 289 | 490 | 539 | 49 | 352 | 95 | 206 | 46 | 784 | 94 | 105 | 163 | 294 | 182 |
| Associate professional | 206 | 280 | 400 | 23 | 242 | 51 | 167 | 15 | 533 | 75 | 110 | 96 | 249 | 164 |
| Clerical worker /secretary | 128 | 66 | 323 | 28 | 206 | 61 | 119 | 23 | 486 | 72 | 164 | 18 | 227 | 169 |
| Shop keeper | 203 | 38 | 261 | 13 | 402 | 78 | 53 | 46 | 159 | 138 | 119 | 24 | 164 | 29 |
| Skilled labourer | 197 | 117 | 304 | 88 | 270 | 49 | 113 | 58 | 169 | 71 | 121 | 17 | 193 | 89 |
| Semi-skilled labourer | 162 | 54 | 171 | 5 | 165 | 109 | 51 | 92 | 276 | 52 | 32 | 39 | 125 | 18 |
| Unskilled labourer | 167 | 100 | 170 | 62 | 139 | 160 | 44 | 110 | 224 | 186 | 180 | 15 | 77 | 16 |
| Agricultural worker | 0 | 3 | 60 | 563 | 14 | 8 | 50 | 194 | 76 | 63 | 189 | 26 | 0 | 1 |
| Average income across occupations including agricultural workers | 231 | | 163 | | 235 | | 73 | | 327 | | 119 | | 239 | |
| Average income across occupations excluding agricultural workers | 231 | | 340 | | 238 | | 85 | | 350 | | 115 | | 239 | |

1 The original data for Dominica Republic is the income per day. It is assumed that there are 20 working days in a month.

**Table 7.9a. Public level social care costs and total costs in international dollars among all participants estimated using 10/66 salary method, by site**

| Types of cost | Method | Cuba | Dominican Republic | Peru (urban) | Peru (rural) | Venezuela | Mexico (urban) | Mexico (rural) | China (urban) | China (rural) | India (urban) | India (rural) | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ADL costs | 10/66 salary method | 221±942 | 223±876 | 104±377 | 54±302 | 75±523 | 194±902 | 154±795 | 357±1247 | 75±478 | 20±160 | 50±186 | 155±757 |
| | Base-case | 293±1245 | 517±1946 | 803±2897 | 408±2170 | 209±1396 | 432±1893 | 383±1893 | 1132±3468 | 308±1762 | 155±1230 | 393±1364 | 442±1978 |
| IADL costs | 10/66 salary method | 120±722 | 77±534 | 51±253 | 29±232 | 102±552 | 194±978 | 61±386 | 112±720 | 34±410 | 8.0±61.4 | 16±59 | 82±562 |
| | Base-case | 158±940 | 178±1218 | 392±1924 | 219±1729 | 289±1564 | 444±2153 | 157±995 | 347±2020 | 133±1167 | 60±458 | 128±476 | 225±1401 |
| Supervision costs | 10/66 salary method | 74±602 | 48±445 | 50±299 | 23±230 | 151±899 | 155±1071 | 93±861 | 34±368 | 2.5±28.6 | 14±133 | 5.5±64.5 | 67±595 |
| | Base-case | 101±829 | 113±1033 | 388±2317 | 192±1918 | 422±2487 | 349±2404 | 266±2417 | 120±1286 | 19±229 | 108±1087 | 44±522 | 194±1654 |
| Informal care costs | 10/66 salary method | 415±1760 | 348±1472 | 206±781 | 106±617 | 329±1537 | 543±2225 | 308±1623 | 502±1855 | 111±799 | 42±315 | 70±265 | 304±1457 |
| | Base-case | 552±2338 | 808±3320 | 1583±6010 | 819±4669 | 920±4243 | 1224±4797 | 806±4145 | 1600±5040 | 460±2714 | 324±2453 | 565±2006 | 861±3869 |
| Total costs of social care | 10/66 salary method | 450±1907 | 467±1911 | 506±2194 | 151±1036 | 432±2012 | 558±2247 | 310±1636 | 965±3098 | 115±807 | 42±315 | 70±265 | 407±1891 |
| | Base-case | 587±2471 | 927±3663 | 1884±6955 | 864±4842 | 1022±4563 | 1240±4818 | 809±4156 | 2062±6168 | 463±2717 | 324±2453 | 565±2006 | 964±4251 |
| Total cost | 10/66 salary method | 584±2134 | 636±1981 | 860±2691 | 275±1174 | 843±2500 | 1036±2578 | 626±1956 | 1191±3314 | 139±852 | 77±368 | 147±940 | 626±2172 |
| | Base-case | 721±2649 | 1096±3702 | 2238±7111 | 988±4895 | 1434±4824 | 1718±4997 | 1124±4365 | 2289±6342 | 488±2736 | 359±2465 | 642±2291 | 1183±4408 |
| | Difference | -19% | -42% | -62% | -72% | -41% | -40% | -44% | -48% | -72% | -79% | -77% | -47% |

**Table 7.9b. Public level social care costs and total costs in international dollars among participants with dementia estimated using 10/66 salary method, by site**

| Types of cost | Method | Cuba | Dominican Republic | Peru (urban) | Peru (rural) | Venezuela | Mexico (urban) | Mexico (rural) | China (urban) | China (rural) | India (urban) | India (rural) | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ADL costs | 10/66 salary method | 1651±2188 | 1102±1785 | 718±762 | 542±909 | 634±1542 | 1206±2279 | 954±1916 | 2673±2961 | 1061±1637 | 185±484 | 176±303 | 1100±1900 |
| | Base-case | 2203±2889 | 2574±3926 | 5616±5957 | 3718±6161 | 1723±3984 | 2457±4249 | 2508±4677 | 8062±6535 | 4048±5595 | 1413±3687 | 1455±2389 | 2945±4597 |
| IADL costs | 10/66 salary method | 882±1654 | 510±1399 | 376±654 | 190±504 | 684±1338 | 1266±2588 | 239±674 | 1098±2267 | 526±1657 | 79±192 | 50±92 | 605±1495 |
| | Base-case | 1167±2150 | 1178±3187 | 2917±4968 | 1352±3692 | 1927±3789 | 2823±5392 | 600±1593 | 3160±5774 | 1713±4285 | 588±1417 | 430±754 | 1549±3568 |
| Supervision costs | 10/66 salary method | 578±1536 | 359±1213 | 394±797 | 142±382 | 1276±2475 | 954±2643 | 513±1989 | 320±1054 | 32±98 | 113±351 | 23±102 | 499±1557 |
| | Base-case | 795±2166 | 840±2813 | 3136±6278 | 958±2588 | 3582±6860 | 2072±5810 | 1276±4686 | 1096±3389 | 208±646 | 857±2623 | 210±1040 | 1389±4147 |
| Informal care costs | 10/66 salary method | 3110±3976 | 1970±3423 | 1489±1761 | 874±1592 | 2594±3955 | 3425±5355 | 1707±3850 | 4091±4796 | 1620±2926 | 378±913 | 249±434 | 2204±3674 |
| | Base-case | 4164±5303 | 4591±7692 | 11669± 13725 | 6028±10932 | 7232±10771 | 7351±10714 | 4383±9145 | 12317± 10036 | 5968±8931 | 2858±6880 | 2095±3574 | 5883±9173 |
| Total costs for social care | 10/66 salary method | 3346±4305 | 2589±4326 | 3679±5176 | 1215±2726 | 3159±4775 | 3494±5348 | 1741±3901 | 7024±6549 | 1620±2926 | 378±913 | 249±434 | 2828±4564 |
| | Base-case | 4400± 5594 | 5210± 8350 | 13859± 15661 | 6368±11376 | 7797±11289 | 7420± 10688 | 4418± 9186 | 15251±11368 | 5968±8931 | 2858±6880 | 2095± 3574 | 6507± 10016 |
| Total cost | 10/66 salary method | 3460±4308 | 2757±4340 | 3846±5174 | 1363±2717 | 3781±5705 | 3807±5398 | 2249±4439 | 7667±6994 | 1646±2940 | 435±957 | 316±521 | 3071±4788 |
| | Base-case | 4514± 5593 | 5378±8354 | 14026± 15641 | 6516± 1137( | 8419±11769 | 7733± 1073( | 4925± 9539 | 15894±11615 | 5995± 8951 | 2915±6902 | 2162± 364( | 6750± 10154 |
| | Difference | -23% | -49% | -73% | -79% | -55% | -51% | -54% | -52% | -73% | -85% | -85% | -55% |

## 7.4. Replacement cost method

This method assumes that the care provided by family members could potentially be replaced by paid home carers (if they were available). Therefore, the unit cost for paid home carers can be used as a proxy value for this care. As described in Section 3, the unit cost of paid home carers was determined according to the minimum wages from the TRAVAIL database of ILO and these data have been described in Table 3.20.

The comparison between costs produced using the replacement cost method and the base-case estimates are shown in Table 7.10a for the whole sample and Table 7.10b for those participants with dementia. For the whole sample, the replacement cost method resulted in large decreases in each category of cost compared with the base-case. The reduction ranged from 36% in Cuba to 68% in urban India. For participants with dementia the reductions are also substantial because of the high use of informal care in this group. Interestingly, the results from using the replacement method and the 10/66 salary method are quite similar.

## 7.5. Leisure time method

As stated in Section 3, time spent by family members or friends providing care can be separated into loss of working time and loss of leisure time. For those carers with full-time or part-time jobs, time spent providing care was firstly considered as resulting in a loss of working time if the carers reported they had cut back from work or stopped work to provide care. The maximum amount of lost working time was based on their reported loss of working hours. The reminder of the time was treated as leisure time. For those not in paid work, all of the time was treated as leisure time.

In the base-case analysis, the values for working time and leisure time are the same. In sensitivity analyses, two scenarios were used. The first was to assume the value of leisure time was equal to 50% of the value of working time. The second one was to change the percentage to 150%. The reason for considering a value that is lower or

**Table7.10a. Public level social care costs and total costs in international dollars among all participants estimated using the replacement cost method, by site**

| Types of cost | Method | Cuba | Dominican Republic | Peru (urban) | Peru (rural) | Venezuela | Mexico (urban) | Mexico (rural) | China (urban) | China (rural) | India (urban) | India (rural) | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ADL costs | Replacement method | 157±667 | 219±823 | 330±1190 | 167±891 | 132±882 | 101±445 | 90±445 | 354±1083 | 96±550 | 38±302 | 96±334 | 169±773 |
| | Base-case | 293±1245 | 517±1946 | 803±2897 | 408±2170 | 209±1396 | 432±1893 | 383±1893 | 1132±3468 | 308±1762 | 155±1230 | 393±1364 | 442±1978 |
| IADL costs | Replacement method | 85±503 | 75±515 | 161±790 | 90±710 | 183±988 | 104±506 | 37±234 | 108±631 | 42±365 | 15±112 | 31±117 | 92±594 |
| | Base-case | 158±940 | 178±1218 | 392±1924 | 219±1729 | 289±1564 | 444±2153 | 157±995 | 347±2020 | 133±1167 | 60±458 | 128±476 | 225±1401 |
| Supervision costs | Replacement method | 54±444 | 48±437 | 159±951 | 79±787 | 266±1571 | 82±565 | 62±568 | 38±402 | 5.9±71.5 | 26±267 | 11±128 | 85±749 |
| | Base-case | 101±829 | 113±1033 | 388±2317 | 192±1918 | 422±2487 | 349±2404 | 266±2417 | 120±1286 | 19±229 | 108±1087 | 44±522 | 194±1654 |
| Informal care costs | Replacement method | 296±1252 | 342±1405 | 650±2468 | 336±1917 | 581±2680 | 288±1128 | 189±974 | 500±1574 | 144±848 | 79±602 | 138±492 | 346±1632 |
| | Base-case | 552±2338 | 808±3320 | 1583±6010 | 819±4669 | 920±4243 | 1224±4797 | 806±4145 | 1600±5040 | 460±2714 | 324±2453 | 565±2006 | 861±3869 |
| Total costs of social care | Replacement method | 330±1403 | 461±1862 | 951±3600 | 381±2161 | 684±3056 | 303±1175 | 192±988 | 962±2894 | 147±856 | 79±602 | 138±492 | 449±2099 |
| | Base-case | 587±2471 | 927±3663 | 1884±6955 | 864±4842 | 1022±4563 | 1240±4818 | 809±4156 | 2062±6168 | 463±2717 | 324±2453 | 565±2006 | 964±4251 |
| Total cost | Replacement method | 464±1698 | 630±1935 | 1305±3913 | 505±2246 | 1095±3413 | 781±1715 | 507±1379 | 1189±3118 | 172±900 | 115±633 | 215±1052 | 668±2356 |
| | Base-case | 721±2649 | 1096±3702 | 2238±7111 | 988±4895 | 1434±4824 | 1718±4997 | 1124±4365 | 2289±6342 | 488±2736 | 359±2465 | 642±2291 | 1183±4408 |
| | Difference | -36% | -43% | -42% | -49% | -24% | -55% | -55% | -48% | -65% | -68% | -67% | -44% |

**Table7.10b. Public level social care costs and total costs in international dollars among participants with dementia estimated using the replacement cost method, by site**

| Types of cost | Method | Cuba | Dominican Republic | Peru (urban) | Peru (rural) | Venezuela | Mexico (urban) | Mexico (rural) | China (urban) | China (rural) | India (urban) | India (rural) | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ADL costs | Replacement method | 1179±1547 | 1089±1661 | 2306±2446 | 1526±2530 | 1088±2516 | 578±999 | 589±1099 | 2518±2042 | 1265±1748 | 346±904 | 357±586 | 1167±1839 |
| | Base-case | 2203±2889 | 2574±3926 | 5616±5957 | 3718±6161 | 1723±3984 | 2457±4249 | 2508±4677 | 8062±6535 | 4048±5595 | 1413±3687 | 1455±2389 | 2945±4597 |
| IADL costs | Replacement method | 625±1152 | 498±1348 | 1198±2040 | 555±1516 | 1217±2393 | 664±1268 | 141±374 | 987±1804 | 535±1339 | 144±347 | 105±185 | 641±1481 |
| | Base-case | 1167±2150 | 1178±3187 | 2917±4968 | 1352±3692 | 1927±3789 | 2823±5392 | 600±1593 | 3160±5774 | 1713±4285 | 588±1417 | 430±754 | 1549±3568 |
| Supervision costs | Replacement method | 426±1160 | 355±1190 | 1287±2578 | 393±1062 | 2263±4333 | 487±1366 | 300±1102 | 342±1059 | 65±202 | 210±643 | 51±255 | 622±1970 |
| | Base-case | 795±2166 | 840±2813 | 3136±6278 | 958±2588 | 3582±6860 | 2072±5810 | 1276±4686 | 1096±3389 | 208±646 | 857±2623 | 210±1040 | 1389±4147 |
| Informal care costs | Replacement method | 2230±2840 | 1942±3254 | 4791±5635 | 2475±4488 | 4568±6804 | 1728±2518 | 1030±2150 | 3848±3135 | 1864±2790 | 701±1687 | 514±876 | 2430±3960 |
| | Base-case | 4164±5303 | 4591±7692 | 11669±13725 | 6028±10932 | 7232±10771 | 7351±10714 | 4383±9145 | 12317±10036 | 5968±8931 | 2858±6880 | 2095±3574 | 5883±9173 |
| Total costs of social care | Replacement method | 2466±3181 | 2561±4179 | 6981±8172 | 2816±5165 | 5134±7431 | 1796±2550 | 1064±2208 | 6782±5111 | 1864±2790 | 701±1687 | 514±876 | 3054±5006 |
| | Base-case | 4400±5594 | 5210±8350 | 13859±15661 | 6368±11376 | 7797±11289 | 7420±10688 | 4418±9186 | 15251±11368 | 5968±8931 | 2858±6880 | 2095±3574 | 6507±10016 |
| Total cost | Replacement method | 2580±3181 | 2729±4198 | 7148±8158 | 2963±5163 | 5755±8096 | 2110±2627 | 1572±2910 | 7425±5599 | 1891±2811 | 758±1718 | 581±949 | 3297±5212 |
| | Base-case | 4514±5593 | 5378±8354 | 14026±15641 | 6516±11376 | 8419±11769 | 7733±10736 | 4925±9539 | 15894±11615 | 5995±8951 | 2915±6902 | 2162±3640 | 6750±10154 |
| | Difference | -43% | -49% | -49% | -55% | -32% | -73% | -68% | -53% | -68% | -74% | -73% | -51% |

higher than that of working time has been discussed in Section 3. In brief, this is based on the neoclassical model of labour-leisure choice (Sendi and Brouwer, 2004). Individuals are considered to seek maximum satisfaction (or utility) from consuming goods (or income) and engaging in leisure. When the person needs to choose from undertaking work or enjoying leisure, he or she will consider the value of time according to his or her budget. Therefore, the value of lost leisure time may be lower or higher than the value of lost work time, according to the person's spending patterns decision.

It was not clear in what order help with ADLs, IADLs or supervision was provided and so the split between work and leisure time cannot be readily investigated for these. Therefore, the focus of these sensitivity analyses is on changes to overall informal care costs, social care costs and total costs. The impact that the leisure time method has on costs is shown in Table 7.11a for the whole sample and Table 7.11b for participants with dementia. For the whole sample, decreasing or increasing the value of leisure time changed total costs by around one-third of the total cost in every centre. The rate is slightly higher among participants with dementia patients.

## 7.6. Carers characteristics method

Average wages differ according to gender, and a person in working age may be more productive than one who is not in working age. Table 2.15 in Section 2 showed the characteristics of carers of participants with dementia in the 10/66 survey. In brief, 77.6% of carers are female in the sample as a whole, ranging from 35.7% in rural China to 83.1% in urban Peru; 77.4% of carers are in working age in the sample as a whole, ranging from 54.5% in urban China to 96.3% in rural India. Working age in this thesis refer to people in 18 to 64 years old.

Information on average wages in a country as a whole was presented in Table 3.21. In the ILO TRAVAIL wage database, information of the average wage for men and women is available for Mexico, Peru and Venezuela. Other countries, including China, Cuba, the Dominican Republic, and India have to be estimated based on imputation. Gender differences in average wages in different WHO regions in the

**Table 7.11a. Public level social care costs and total costs in international dollars among all participants estimated using different unit costs for loss of working time and loss of leisure time, by site**

| Types of cost | Cuba | Dominican Republic | Peru (urban) | Peru (rural) | Venezuela | Mexico (urban) | Mexico (rural) | China (urban) | China (rural) | India (urban) | India (rural) | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Base-case* | | | | | | | | | | | | |
| Informal care costs | 552±2338 | 808±3320 | 1583±6010 | 819±4669 | 920±4243 | 1224±4797 | 806±4145 | 1600±5040 | 460±2714 | 324±2453 | 565±2006 | 861±3869 |
| Total costs of social care | 587±2471 | 927±3663 | 1884±6955 | 864±4842 | 1022±4563 | 1240±4818 | 809±4156 | 2062±6168 | 463±2717 | 324±2453 | 565±2006 | 964±4251 |
| Total cost | 721±2649 | 1096±3702 | 2238±7111 | 988±4895 | 1434±4824 | 1718±4997 | 1124±4365 | 2289±6342 | 488±2736 | 359±2465 | 642±2291 | 1183±4408 |
| *Leisure time 50% of working time* | | | | | | | | | | | | |
| Informal care costs | 298±1246 | 450±1842 | 815±3102 | 437±2447 | 475±2188 | 653±2550 | 450±2284 | 814±2563 | 274±1605 | 176±1347 | 304±1091 | 458±2046 |
| Total costs of social care | 333±1398 | 570±2249 | 1116±4166 | 481±2705 | 578±2598 | 668±2578 | 453±2294 | 1277±3793 | 277±1610 | 176±1347 | 304±1091 | 561±2486 |
| Total cost | 467±1694 | 738±2310 | 1470±4438 | 605±2775 | 989±3003 | 1147±2872 | 768±2565 | 1503±3998 | 302±1638 | 212±1366 | 381±1506 | 780±2718 |
| Difference | -35% | -33% | -34% | -39% | -31% | -33% | -32% | -34% | -38% | -41% | -41% | -34% |
| *Leisure time 150% of working time* | | | | | | | | | | | | |
| Informal care costs | 806±3444 | 1166±4833 | 2351±8934 | 1202±6920 | 1365±6308 | 1796±7074 | 1161±6033 | 2386±7528 | 646±3840 | 471±3567 | 826±2931 | 1264±5712 |
| Total costs of social care | 841±3569 | 1285±5146 | 2652±9828 | 1246±7060 | 1468±6594 | 1811±7093 | 1164±6043 | 2848±8610 | 649±3843 | 471±3567 | 826±2931 | 1366±6069 |
| Total cost | 975±3694 | 1454±5174 | 3006±9932 | 1370±7105 | 1879±6790 | 2290±7226 | 1479±6227 | 3074±8769 | 674±3859 | 506±3577 | 902±3156 | 1586±6192 |
| Difference | 35% | 33% | 34% | 39% | 31% | 33% | 32% | 34% | 38% | 41% | 40% | 34% |

**Table 7.11b. Public level social care costs and total costs in international dollars among participants with dementia estimated using different unit costs for loss of working time and loss of leisure time, by site**

| Types of cost | Cuba | Dominican Republic | Peru (urban) | Peru (rural) | Venezuela | Mexico (urban) | Mexico (rural) | China (urban) | China (rural) | India (urban) | India (rural) | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Base-case* | | | | | | | | | | | | |
| Informal care costs | 4164±5303 | 4591±7692 | 11669± 13725 | 6028±10932 | 7232±10771 | 7351±10714 | 4383±9145 | 12317± 10036 | 5968±8931 | 2858±6880 | 2095±3574 | 5883±9173 |
| Total costs of social care | 4400±5594 | 5210±8350 | 13859± 15661 | 6368±11376 | 7797±11289 | 7420±10688 | 4418±9186 | 15251± 11368 | 5968±8931 | 2858±6880 | 2095±3574 | 6507±10016 |
| Total cost | 4514±5593 | 5378±8354 | 14026± 15641 | 6516±11376 | 8419±11769 | 7733±10736 | 4925±9539 | 15894± 11615 | 5995±8951 | 2915±6902 | 2162±3640 | 6750±10154 |
| *Leisure time 50% of working time* | | | | | | | | | | | | |
| Informal care costs | 2227±2790 | 2533±4219 | 5952±7105 | 3307±5731 | 3774±5609 | 3879±5543 | 2338±4798 | 6304±5101 | 3562±5285 | 1595±3862 | 1141±1969 | 3124±4821 |
| Total costs of social care | 2463±3140 | 3151±5005 | 8142±9399 | 3648±6589 | 4340±6285 | 3947±5536 | 2373±4841 | 9238±6784 | 3562±5285 | 1595±3862 | 1141±1969 | 3748±5809 |
| Total cost | 2577±3142 | 3320±5018 | 8309±9384 | 3795±6581 | 4962±7050 | 4261±5586 | 2880±5292 | 9881±7180 | 3589±5307 | 1652±3889 | 1208±2037 | 3992±5996 |
| Difference | -43% | -38% | -41% | -42% | -41% | -45% | -42% | -38% | -40% | -43% | -44% | -41% |
| *Leisure time 150% of working time* | | | | | | | | | | | | |
| Informal care costs | 6102±7857 | 6650±11241 | 17386± 20383 | 8748±16258 | 10690± 15985 | 10824± 15955 | 6428±13524 | 18330± 15036 | 8374±12645 | 4121±9927 | 3049±5199 | 8642±13580 |
| Total costs of social care | 6337±8124 | 7268±11843 | 19576± 22167 | 9089±16539 | 11255± 16441 | 10892± 15922 | 6462±13564 | 21264± 16222 | 8374±12645 | 4121±9927 | 3049±5199 | 9266±14363 |
| Total cost | 6452±8121 | 7436±11842 | 19743± 22145 | 9237±16542 | 11877± 16801 | 11206± 15971 | 6970±13879 | 21907± 16399 | 8401±12665 | 4178±9946 | 3116±5265 | 9510±14478 |
| Difference | 43% | 38% | 41% | 42% | 41% | 45% | 42% | 38% | 40% | 43% | 44% | 41% |

World Alzheimer's Report 2010 (Wimo and Prince, 2010) reported ratios between men vs all persons, and women vs all persons. The table was revised in accordance with the need for this thesis (Table 7.12).

**Table 7.12. Gender differences in average wage in China, Cuba, Dominican Republic, and India**

| Countries | WHO region | Men vs All | Women vs All | Women vs Men |
|---|---|---|---|---|
| China | Asia East | 1.20 | 0.80 | 0.67 |
| Cuba | Latin America Central | 1.10 | 0.82 | 0.74 |
| Dominican Republic | Latin America Central | 1.10 | 0.82 | 0.74 |
| India | Asia South | 1.04 | 0.84 | 0.81 |

Revised from Wimo, A. and M. Prince (2010). World Alzheimer Report 2010: The global economic impact of dementia.

Information provided in Table 7.12 can be used for the imputations of average wages for men and women in China, Cuba, the Dominican Republic, and India. For example, the ratio of 'Men vs All' in China can be multiplied with the average wage in that country to generate the average wage for men. The average wages for men and women for different countries are shown in Table 7.13. PPPs in 2008 were used to convert these into international dollars.

**Table 7.13. Monthly average wages for men and women in different countries in 2008**

| Countries | Local currency | PPPs in 2008 | Average wage in the Local currency | | | Average wage in international dollars | | |
|---|---|---|---|---|---|---|---|---|
| | | | Whole population | Male | Female | Whole population | Male | Female |
| China* | Yuan | 3.822 | 2436 | 2923 | 1949 | 637 | 765 | 510 |
| Cuba* | Pesos | 1.357 | 421 | 463 | 345 | 310 | 341 | 254 |
| Dominican Republic* | Dominican peso | 19.431 | 10609 | 11670 | 8699 | 546 | 601 | 448 |
| India* | Rupee | 16.217 | 8466 | 8805 | 7111 | 522 | 543 | 439 |
| Mexico | Pesos | 7.470 | 5627 | 6188 | 4821 | 753 | 828 | 645 |
| Peru | Nuevo sol | 1.507 | 1340 | 1568 | 1004 | 889 | 1040 | 666 |
| Venezuela | Bolivar Fuerte** | 1.873 | 1265 | 1310 | 915 | 676 | 699 | 489 |

* Wage estimation for men and women is based on the ratios provided in World Alzheimer Report (Wimo and Prince, 2010)

** Venezuelan Bolivar Fuerte = 1000Venezuelan Bolivar

The value for a person not of working age was determined to be 50% of the value of people of working age based on the World Alzheimer Report 2010 (Wimo and Prince, 2010). The average wages for men and women and for persons of working age and not of working age were used as the unit costs of informal care separately. Therefore, the focus of these sensitivity analyses is on changes to overall informal care costs, social care costs and total costs. The impact of the carers characteristics method with regard to gender is shown in Table 7.12a for the whole sample and 7.12b for participants with dementia. The impact that the carers characteristics method with regard to working age is described in Table 7.13a for the whole sample and 7.13b for participants with dementia. The impact that of both of these combined is described in Table 7.14a for the whole sample and 7.14b for participants with dementia. For more straightforward comparisons, the differences between the estimation from the carers' characteristics method and the base-case from the former six tables are summarised in Table 7.15.

For the whole sample, decreasing the value of female informal care and increasing the value of male informal care resulted in decreases in each category of cost by around 10% compared with the base-case for the sample as a whole, ranging from 3% in rural China to 15% in rural Peru and Venezuela. The decrease among dementia patients is slightly larger, due to more female carers for participants with dementia, which has been reported in section 2 (Table 2.12 and Table 2.15).

For the whole sample, attaching less value to time lost by people not of working age leads to 9% decreases in total cost in the sample as a whole, and this varies across the sites from 4% in India and Venezuela, to 15% in urban China. The decrease in costs of care for participants with dementia is slightly more in Cuba, the Dominican Republic, urban Peru, Venezuela, rural Mexico, China and rural India, but smaller in rural Peru, urban Mexico and urban India.

When considering the two factors together, larger decreases are shown for participants with dementia except in urban Mexico and India. However, as stated in Table 7.15, these decreases cannot be simply added together to generate the combined decrease. The real combined decreases rate may be smaller than the mathematical sum of the two separate figures.

**Table7.12a. Public level social care costs and total costs in international dollars among all participants estimated using different average wage for male and female carers, by site**

| Types of cost | Method | Cuba | Dominican Republic | Peru (urban) | Peru (rural) | Venezuela | Mexico (urban) | Mexico (rural) | China (urban) | China (rural) | India (urban) | India (rural) | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ADL costs | Carers characteristics method | 255±1084 | 444±1652 | 660±2419 | 330±1773 | 160±1059 | 386±1690 | 349±1724 | 1036±3180 | 297±1679 | 132±1051 | 346±1202 | 384±1725 |
| | Base-case | 293±1245 | 517±1946 | 803±2897 | 408±2170 | 209±1396 | 432±1893 | 383±1893 | 1132±3468 | 308±1762 | 155±1230 | 393±1364 | 442±1978 |
| IADL costs | Carers characteristics method | 136±810 | 154±1024 | 323±1612 | 174±1326 | 227±1261 | 397±1946 | 141±881 | 321±1822 | 130±1200 | 54±411 | 112±419 | 194±1212 |
| | Base-case | 158±940 | 178±1218 | 392±1924 | 219±1729 | 289±1564 | 444±2153 | 157±995 | 347±2020 | 133±1167 | 60±458 | 128±476 | 225±1401 |
| Supervision costs | Carers characteristics method | 89±750 | 99±919 | 321±1977 | 170±1732 | 325±1940 | 308±2114 | 238±2136 | 112±1289 | 17±209 | 95±986 | 40±479 | 164±1418 |
| | Base-case | 101±829 | 113±1033 | 388±2317 | 192±1918 | 422±2487 | 349±2404 | 266±2417 | 120±1286 | 19±229 | 108±1087 | 44±522 | 194±1654 |
| Informal care costs | Carers characteristics method | 480±2036 | 697±2839 | 1305±5100 | 674±3960 | 712±3280 | 1091±4239 | 728±3707 | 1468±4716 | 444±2617 | 281±2142 | 498±1783 | 742±3344 |
| | Base-case | 552±2338 | 808±3320 | 1583±6010 | 819±4669 | 920±4243 | 1224±4797 | 806±4145 | 1600±5040 | 460±2714 | 324±2453 | 565±2006 | 861±3869 |
| Total costs of social care | Carers characteristics method | 515±2168 | 816±3198 | 1605±6023 | 718±4129 | 815±3637 | 1106±4261 | 731±3720 | 1931±5836 | 448±2621 | 281±2142 | 498±1783 | 844±3732 |
| | Base-case | 587±2471 | 927±3663 | 1884±6955 | 864±4842 | 1022±4563 | 1240±4818 | 809±4156 | 2062±6168 | 463±2717 | 324±2453 | 565±2006 | 964±4251 |
| Total cost | Carers characteristics method | 649±2370 | 984±3241 | 1959±6208 | 843±4191 | 1226±3948 | 1584±4458 | 1046±3934 | 2157±6001 | 472±2642 | 316±2155 | 574±2081 | 1063±3902 |
| | Base-case | 721±2649 | 1096±3702 | 2238±7111 | 988±4895 | 1434±4824 | 1718±4997 | 1124±4365 | 2289±6342 | 488±2736 | 359±2465 | 642±2291 | 1183±4408 |
| | Difference | -10% | -10% | -12% | -15% | -15% | -8% | -7% | -6% | -3% | -12% | -11% | -10% |

**Table7.12b. Public level social care costs and total costs in international dollars among participants with dementia estimated using different average wage for male and female carers, by site**

| Types of cost | Method | Cuba | Dominican Republic | Peru (urban) | Peru (rural) | Venezuela | Mexico (urban) | Mexico (rural) | China (urban | China (rural) | India (urban) | India (rural) | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ADL costs | Carers characteristics method | 1908±2504 | 2215±3325 | 4568±4978 | 2928±4887 | 1282±2910 | 2167±3706 | 2292±4275 | 7244±5814 | 3844±5253 | 1188±3101 | 1292±2134 | 2532±3950 |
| | Base-case | 2203±2889 | 2574±3926 | 5616±5957 | 3718±6161 | 1723±3984 | 2457±4249 | 2508±4677 | 8062±6535 | 4048±5595 | 1413±3687 | 1455±2389 | 2945±4597 |
| IADL costs | Carers characteristics method | 1010±1890 | 1008±2654 | 2409±4232 | 1084±2890 | 1526±3181 | 2521±4964 | 533±1392 | 2853±4995 | 1693±4482 | 526±1283 | 381±672 | 1334±3123 |
| | Base-case | 1167±2150 | 1178±3187 | 2917±4968 | 1352±3692 | 1927±3789 | 2823±5392 | 600±1593 | 3160±5774 | 1713±4285 | 588±1417 | 430±754 | 1549±3568 |
| Supervision costs | Carers characteristics method | 692±1904 | 737±2498 | 2638±5504 | 860±2635 | 2687±5179 | 1788±4980 | 1136±4084 | 970±3028 | 208±660 | 727±2207 | 202±1050 | 1160±3472 |
| | Base-case | 795±2166 | 840±2813 | 3136±6278 | 958±2588 | 3582±6860 | 2072±5810 | 1276±4686 | 1096±3389 | 208±646 | 857±2623 | 210±1040 | 1389±4147 |
| Informal care costs | Carers characteristics method | 3610±4595 | 3960±6560 | 9615±11945 | 4871±9219 | 5495±8170 | 6476±9348 | 3961±8096 | 11066±9168 | 5744±8679 | 2442±5803 | 1876±3295 | 5026±7866 |
| | Base-case | 4164±5303 | 4591±7692 | 11669±13725 | 6028±10932 | 7232±10771 | 7351±10714 | 4383±9145 | 12317±10036 | 5968±8931 | 2858±6880 | 2095±3574 | 5883±9173 |
| Total costs of social care | Carers characteristics method | 3846±4884 | 4579±7260 | 11805±13739 | 5212±9654 | 6060±8760 | 6545±9324 | 3995±8150 | 14000±10426 | 5744±8679 | 2442±5803 | 1876±3295 | 5650±8702 |
| | Base-case | 4400±5594 | 5210±8350 | 13859±15661 | 6368±11376 | 7797±11289 | 7420±10688 | 4418±9186 | 15251±11368 | 5968±8931 | 2858±6880 | 2095±3574 | 6507±10016 |
| Total cost | Carers characteristics method | 3961±4884 | 4747±7263 | 11972±13720 | 5360±9648 | 6682±9343 | 6858±9370 | 4503±8503 | 14643±10628 | 5771±8700 | 2498±5828 | 1943±3356 | 5893±8841 |
| | Base-case | 4514±5593 | 5378±8354 | 14026±15641 | 6516±11376 | 8419±11769 | 7733±10736 | 4925±9539 | 15894±11615 | 5995±8951 | 2915±6902 | 2162±3640 | 6750±10154 |
| | Difference | -12% | -12% | -15% | -18% | -21% | -11% | -9% | -8% | -4% | -14% | -10% | -13% |

**Table7.13a. Public level social care costs and total costs in international dollars among all participants estimated using different average wage for carers in working age and not in working age, by site**

| Types of cost | Method | Cuba | Dominican Republic | Peru (urban) | Peru (rural) | Venezuela | Mexico (urban) | Mexico (rural) | China (urban) | China (rural) | India (urban) | India (rural) | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ADL costs | Carers characteristics method | 241±1054 | 470±1836 | 701±2651 | 373±2050 | 198±1349 | 394±1775 | 337±1665 | 881±2818 | 265±1602 | 147±1205 | 374±1299 | 383±1771 |
| | Base-case | 293±1245 | 517±1946 | 803±2897 | 408±2170 | 209±1396 | 432±1893 | 383±1893 | 1132±3468 | 308±1762 | 155±1230 | 393±1364 | 442±1978 |
| IADL costs | Carers characteristics method | 131±805 | 162±1112 | 352±1815 | 172±1260 | 271±1454 | 393±1942 | 142±910 | 274±1623 | 126±1153 | 58±448 | 123±462 | 199±1251 |
| | Base-case | 158±940 | 178±1218 | 392±1924 | 219±1729 | 289±1564 | 444±2153 | 157±995 | 347±2020 | 133±1167 | 60±458 | 128±476 | 225±1401 |
| Supervision costs | Carers characteristics method | 80±660 | 101±912 | 343±2124 | 177±1863 | 392±2366 | 313±2203 | 242±2268 | 103±1200 | 19±229 | 106±1085 | 41±509 | 175±1537 |
| | Base-case | 101±829 | 113±1033 | 388±2317 | 192±1918 | 422±2487 | 349±2404 | 266±2417 | 120±1286 | 19±229 | 108±1087 | 44±522 | 194±1654 |
| Informal care costs | Carers characteristics method | 453±1968 | 733±3084 | 1396±5520 | 722±4242 | 861±4074 | 1100±4391 | 721±3749 | 1258±4224 | 410±2571 | 310±2425 | 538±1917 | 757±3528 |
| | Base-case | 552±2338 | 808±3320 | 1583±6010 | 819±4669 | 920±4243 | 1224±4797 | 806±4145 | 1600±5040 | 460±2714 | 324±2453 | 565±2006 | 861±3869 |
| Total costs of social care | Carers characteristics method | 488±2104 | 852±3424 | 1696±6531 | 766±4433 | 964±4398 | 1115±4414 | 724±3760 | 1720±5405 | 414±2574 | 310±2425 | 538±1917 | 860±3921 |
| | Base-case | 587±2471 | 927±3663 | 1884±6955 | 864±4842 | 1022±4563 | 1240±4818 | 809±4156 | 2062±6168 | 463±2717 | 324±2453 | 565±2006 | 964±4251 |
| Total cost | Carers characteristics method | 622±2310 | 1021±3467 | 2051±6696 | 890±4488 | 1375±4661 | 1593±4612 | 1038±3991 | 1947±5569 | 438±2592 | 346±2436 | 614±2165 | 1079±4083 |
| | Base-case | 721±2649 | 1096±3702 | 2238±7111 | 988±4895 | 1434±4824 | 1718±4997 | 1124±4365 | 2289±6342 | 488±2736 | 359±2465 | 642±2291 | 1183±4408 |
| | Difference | -14% | -7% | -8% | -10% | -4% | -7% | -8% | -15% | -10% | -4% | -4% | -9% |

**Table7.13b. Public level social care costs and total costs in international dollars among participants with dementia estimated using different average wage for carers in working age and not in working age, by site**

| Types of cost | Method | Cuba | Dominican Republic | Peru (urban) | Peru (rural) | Venezuela | Mexico (urban) | Mexico (rural) | China (urban) | China (rural) | India (urban) | India (rural) | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ADL costs | Carers characteristics method | 1804±2458 | 2319±3717 | 4953±5708 | 3549±6004 | 1627±3832 | 2355±4138 | 2202±4083 | 6228±5557 | 3451±5174 | 1397±3685 | 1389±2272 | 2562±4173 |
| | Base-case | 2203±2889 | 2574±3926 | 5616±5957 | 3718±6161 | 1723±3984 | 2457±4249 | 2508±4677 | 8062±6535 | 4048±5595 | 1413±3687 | 1455±2389 | 2945±4597 |
| IADL costs | Carers characteristics method | 951±1818 | 1063±2900 | 2613±4726 | 1268±3615 | 1767±3322 | 2675±5280 | 541±1446 | 2529±4743 | 1635±4276 | 572±1403 | 419±747 | 1374±3258 |
| | Base-case | 1167±2150 | 1178±3187 | 2917±4968 | 1352±3692 | 1927±3789 | 2823±5392 | 600±1593 | 3160±5774 | 1713±4285 | 588±1417 | 430±754 | 1549±3568 |
| Supervision costs | Carers characteristics method | 633±1747 | 743±2469 | 2722±5701 | 789±1956 | 3460±6777 | 1989±5775 | 1147±4234 | 888±3025 | 208±646 | 857±2623 | 182±982 | 1250±3889 |
| | Base-case | 795±2166 | 840±2813 | 3136±6278 | 958±2588 | 3582±6860 | 2072±5810 | 1276±4686 | 1096±3389 | 208±646 | 857±2623 | 210±1040 | 1389±4147 |
| Informal care costs | Carers characteristics method | 3388±4505 | 4125±7151 | 10288±12836 | 5605±10234 | 6854±10551 | 7019±10558 | 3890±8155 | 9644±9124 | 5294±8677 | 2826±6876 | 1990±3377 | 5185±8532 |
| | Base-case | 4164±5303 | 4591±7692 | 11669±13725 | 6028±10932 | 7232±10771 | 7351±10714 | 4383±9145 | 12317±10036 | 5968±8931 | 2858±6880 | 2095±3574 | 5883±9173 |
| Total costs of social care | Carers characteristics method | 3624±4794 | 4744±7798 | 12478±15029 | 5946±10720 | 7420±11051 | 7087±10534 | 3924±8203 | 12578±10732 | 5294±8677 | 2826±6876 | 1990±3377 | 5809±9400 |
| | Base-case | 4400±5594 | 5210±8350 | 13859±15661 | 6368±11376 | 7797±11289 | 7420±10688 | 4418±9186 | 15251±11368 | 5968±8931 | 2858±6880 | 2095±3574 | 6507±10016 |
| Total cost | Carers characteristics method | 3738±4790 | 4912±7808 | 12646±15016 | 6094±10727 | 8042±11522 | 7401±10574 | 4432±8619 | 13221±10988 | 5320±8688 | 2883±6892 | 2057±3423 | 6052±9540 |
| | Base-case | 4514±5593 | 5378±8354 | 14026±15641 | 6516±11376 | 8419±11769 | 7733±10736 | 4925±9539 | 15894±11615 | 5995±8951 | 2915±6902 | 2162±3640 | 6750±10154 |
| | Difference | -17% | -9% | -10% | -6% | -4% | -4% | -10% | -17% | -11% | -1% | -5% | -10% |

**Table7.14a. Public level social care costs and total costs in international dollars among all participants estimated using different average wage for different working age male and female carers, by site**

| Types of cost | Method | Cuba | Dominican Republic | Peru (urban) | Peru (rural) | Venezuela | Mexico (urban) | Mexico (rural) | China (urban) | China (rural) | India (urban) | India (rural) | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ADL costs | Carers characteristics method | 210±912 | 402±1553 | 566±2149 | 300±1644 | 151±1022 | 351±1573 | 306±1513 | 798±2543 | 255±1497 | 126±1030 | 328±1142 | 330±1517 |
| | Base-case | 293±1245 | 517±1946 | 803±2897 | 408±2170 | 209±1396 | 432±1893 | 383±1893 | 1132±3468 | 308±1762 | 155±1230 | 393±1364 | 442±1978 |
| IADL costs | Carers characteristics method | 113±696 | 140±938 | 284±1455 | 136±966 | 212±1142 | 350±1767 | 127±806 | 251±1430 | 123±1186 | 51±403 | 108±402 | 170±1069 |
| | Base-case | 158±940 | 178±1218 | 392±1924 | 219±1729 | 289±1564 | 444±2153 | 157±995 | 347±2020 | 133±1167 | 60±458 | 128±476 | 225±1401 |
| Supervision costs | Carers characteristics method | 71±599 | 88±797 | 275±1666 | 154±1651 | 301±1826 | 273±1905 | 215±1975 | 97±1230 | 17±209 | 93±984 | 37±469 | 146±1287 |
| | Base-case | 101±829 | 113±1033 | 388±2317 | 192±1918 | 422±2487 | 349±2404 | 266±2417 | 120±1286 | 19±229 | 108±1087 | 44±522 | 194±1654 |
| Informal care costs | Carers characteristics method | 393±1707 | 631±2631 | 1125±4432 | 590±3543 | 665±3122 | 975±3854 | 648±3327 | 1145±3905 | 395±2456 | 270±2119 | 473±1702 | 646±2985 |
| | Base-case | 552±2338 | 808±3320 | 1583±6010 | 819±4669 | 920±4243 | 1224±4797 | 806±4145 | 1600±5040 | 460±2714 | 324±2453 | 565±2006 | 861±3869 |
| Total costs of social care | Carers characteristics method | 428±1844 | 750±2987 | 1425±5463 | 634±3731 | 767±3486 | 990±3878 | 651±3341 | 1608±5075 | 398±2460 | 270±2119 | 473±1702 | 749±3389 |
| | Base-case | 587±2471 | 927±3663 | 1884±6955 | 864±4842 | 1022±4563 | 1240±4818 | 809±4156 | 2062±6168 | 463±2717 | 324±2453 | 565±2006 | 964±4251 |
| Total cost | Carers characteristics method | 562±2076 | 918±3035 | 1780±5664 | 758±3799 | 1179±3803 | 1468±4097 | 966±3578 | 1834±5234 | 423±2478 | 306±2131 | 550±1967 | 968±3569 |
| | Base-case | 721±2649 | 1096±3702 | 2238±7111 | 988±4895 | 1434±4824 | 1718±4997 | 1124±4365 | 2289±6342 | 488±2736 | 359±2465 | 642±2291 | 1183±4408 |
| | Difference | -22% | -16% | -20% | -23% | -18% | -15% | -14% | -20% | -13% | -15% | -14% | -18% |

**Table7.14b. Public level social care costs and total costs in international dollars among participants with dementia estimated using different working age male and female carers, by site**

| Types of cost | Method | Cuba | Dominican Republic | Peru (urban) | Peru (rural) | Venezuela | Mexico (urban) | Mexico (rural) | China (urban) | China (rural) | India (urban) | India (rural) | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ADL costs | Carers characteristics method | 1561±2111 | 1996±3145 | 3963±4617 | 2730±4549 | 1213±2802 | 2078±3615 | 2001±3707 | 5575±4951 | 3241±4701 | 1175±3099 | 1236±2044 | 2186±3524 |
| | Base-case | 2203±2889 | 2574±3926 | 5616±5957 | 3718±6161 | 1723±3984 | 2457±4249 | 2508±4677 | 8062±6535 | 4048±5595 | 1413±3687 | 1455±2389 | 2945±4597 |
| IADL costs | Carers characteristics method | 822±1612 | 912±2419 | 2112±3809 | 985±2734 | 1386±2638 | 2388±4870 | 478±1253 | 2264±4014 | 1610±4468 | 512±1272 | 372±667 | 1175±2809 |
| | Base-case | 1167±2150 | 1178±3187 | 2917±4968 | 1352±3692 | 1927±3789 | 2823±5392 | 600±1593 | 3160±5774 | 1713±4285 | 588±1417 | 430±754 | 1549±3568 |
| Supervision costs | Carers characteristics method | 552±1572 | 648±2144 | 2200±4492 | 662±1706 | 2599±5124 | 1710±4946 | 1026±3706 | 790±2752 | 208±660 | 727±2207 | 179±1010 | 1031±3160 |
| | Base-case | 795±2166 | 840±2813 | 3136±6278 | 958±2588 | 3582±6860 | 2072±5810 | 1276±4686 | 1096±3389 | 208±646 | 857±2623 | 210±1040 | 1389±4147 |
| Informal care costs | Carers characteristics method | 2936±3904 | 3555±6082 | 8275±10287 | 4377±7909 | 5197±7948 | 6176±9216 | 3505±7218 | 8629±8208 | 5059±8323 | 2415±5801 | 1788±3148 | 4392±7119 |
| | Base-case | 4164±5303 | 4591±7692 | 11669±13725 | 6028±10932 | 7232±10771 | 7351±10714 | 4383±9145 | 12317±10036 | 5968±8931 | 2858±6880 | 2095±3574 | 5883±9173 |
| Total costs of social care | Carers characteristics method | 3171±4193 | 4174±6771 | 10465±12487 | 4718±8433 | 5763±8529 | 6245±9194 | 3539±7280 | 11563±9760 | 5059±8323 | 2415±5801 | 1788±3148 | 5016±7999 |
| | Base-case | 4400±5594 | 5210±8350 | 13859±15661 | 6368±11376 | 7797±11289 | 7420±10688 | 4418±9186 | 15251±11368 | 5968±8931 | 2858±6880 | 2095±3574 | 6507±10016 |
| Total cost | Carers characteristics method | 3286±4190 | 4342±6780 | 10632±12476 | 4865±8435 | 6384±9111 | 6558±9231 | 4046±7698 | 12206±9986 | 5086±8333 | 2472±5819 | 1855±3189 | 5260±8147 |
| | Base-case | 4514±5593 | 5378±8354 | 14026±15641 | 6516±11376 | 8419±11769 | 7733±10736 | 4925±9539 | 15894±11615 | 5995±8951 | 2915±6902 | 2162±3640 | 6750±10154 |
| | Difference | -27% | -19% | -24% | -25% | -24% | -15% | -18% | -23% | -15% | -15% | -14% | -22% |

**Table7.15. Changing of the total costs when adjusted by gender only, age only, and both, by site**

| Sample | Adjusted factors | Cuba | Dominican Republic | Peru (urban) | Peru (rural) | Venezuela | Mexico (urban) | Mexico (rural) | China (urban) | China (rural) | India (urban) | India (rural) | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Whole sample | Gender | -10% | -10% | -12% | -15% | -15% | -8% | -7% | -6% | -3% | -12% | -11% | -10% |
| | Age | -14% | -7% | -8% | -10% | -4% | -7% | -8% | -15% | -10% | -4% | -4% | -9% |
| | Gender and Age | -22% | -16% | -20% | -23% | -18% | -15% | -14% | -20% | -13% | -15% | -14% | -18% |
| Dementia patients | Gender | -12% | -12% | -15% | -18% | -21% | -11% | -9% | -8% | -4% | -14% | -10% | -13% |
| | Age | -17% | -9% | -10% | -6% | -4% | -4% | -10% | -17% | -11% | -1% | -5% | -10% |
| | Gender and Age | -27% | -19% | -24% | -25% | -24% | -15% | -18% | -23% | -15% | -15% | -14% | -22% |

## 7.7. All informal care method

Informal care from relatives or friends other than the main carer is not included in the base-case analysis. Only the total time spent for providing help and information about stopping work or cutting back from work was collected for other informal care. The time spent for providing this other care could not be separated into ADL, IADL and supervision. Therefore, the cost of 'other informal care' was treated as a separate category in the analyses and it was aggregated with the original total cost in the base-case to generate the total cost estimated from 'All informal care method'. Inclusion of these costs formed the sensitivity analyses presented here.

The impact of these sensitivity analyses on costs are shown in Table 7.16a for the whole sample and Table 7.16b for the participants who had dementia. For the whole sample, costs were increased by around 10% when this method was used and the change ranged from 1% in urban China to 17% in urban Mexico. Among participants with dementia the impact remained greatest in urban Mexico and least in urban China.

## Summary of section

In this section, sensitivity analyses were conducted to assess the impact of making different assumptions about unit costs of medical care and social care.

The 'percentage method' and the 'GDP-ratio method' changed the unit cost of publicly owned health services. The GDP-ratio method produced a very similar estimate of cost compared with the base case. The percentage method has less impact on total cost among participants with dementia.

The '10/66 salary method', 'replacement cost approach', 'leisure time method' and 'carers characteristics method' gave different estimates of the cost of informal caregiver time. All these method influence the costs for the dementia sample more than for the whole sample, because informal care is the most import component of costs among those with dementia. Decreases in costs are shown for these methods, except when leisure time was valued as 150% of working time. The 'carers

characteristics method' had the least impact on cost. The 'all informal care method' included the informal care provided by those other than the main caregivers and resulted in increases in cost of around 10% for the whole sample and 11% for the dementia sample.

**Table 7.16a. Public level social care costs and total costs in international dollars among all participants estimated by including 'other informal care', by site**

| Types of informal care | Method | Cuba | Dominican Republic | Peru (urban) | Peru (rural) | Venezuela | Mexico (urban) | Mexico (rural) | China (urban) | China (rural) | India (urban) | India (rural) | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Costs of other informal care | Other informal care method | 88±606 | 172±1090 | 183±1320 | 103±862 | 173±1017 | 291±1535 | 128±840 | 31±391 | 23±251 | 12±171 | 85±447 | 122±891 |
| Informal care costs | Other informal care method | 640±2668 | 980±3836 | 1766±6480 | 922±5262 | 1093±4710 | 1515±5495 | 934±4551 | 1631±5101 | 483±2778 | 336±2510 | 650±2309 | 983±4244 |
| | Base-case | 552±2338 | 808±3320 | 1583±6010 | 819±4669 | 920±4243 | 1224±4797 | 806±4145 | 1600±5040 | 460±2714 | 324±2453 | 565±2006 | 861±3869 |
| Total costs of social care | Other informal care method | 675±2800 | 1099±4170 | 2067±7406 | 967±5441 | 1196±5045 | 1531±5521 | 937±4561 | 2094±6230 | 486±2784 | 336±2510 | 650±2309 | 1086±4616 |
| | Base-case | 587±2471 | 927±3663 | 1884±6955 | 864±4842 | 1022±4563 | 1240±4818 | 809±4156 | 2062±6168 | 463±2717 | 324±2453 | 565±2006 | 964±4251 |
| Total costs | Other informal care method | 809±2959 | 1268±4205 | 2421±7548 | 1091±5494 | 1607±5285 | 2009±5708 | 1252±4757 | 2320±6404 | 511±2803 | 371±2523 | 727±2562 | 1305±4766 |
| | Base-case | 721±2649 | 1096±3702 | 2238±7111 | 988±4895 | 1434±4824 | 1718±4997 | 1124±4365 | 2289±6342 | 488±2736 | 359±2465 | 642±2291 | 1183±4408 |
| | Difference | 12% | 16% | 8% | 10% | 12% | 17% | 11% | 1% | 5% | 3% | 13% | 10% |

**Table 7.16b. Public level social care costs and total costs in international dollars among participants with dementia estimated by including 'other informal care', by site**

| Types of informal care | Method | Cuba | Dominican Republic | Peru (urban) | Peru (rural) | Venezuela | Mexico (urban) | Mexico (rural) | China (urban) | China (rural) | India (urban) | India (rural) | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Costs of other informal care | Other informal care method | 610±1493 | 812±2284 | 1180±3190 | 1015±2937 | 1389±2817 | 1513±3010 | 524±1583 | 175±739 | 280±861 | 109±495 | 394±1018 | 763±2127 |
| Informal care costs | Other informal care method | 4774±6059 | 5403±8573 | 12849± 14320 | 7043± 13176 | 8621±11783 | 8865±11787 | 4908±9940 | 12492± 10048 | 6248± 9051 | 2966± 7093 | 2489± 4277 | 6646±9915 |
| | Base-case | 4164±5303 | 4591±7692 | 11669± 13725 | 6028± 10932 | 7232±10771 | 7351±10714 | 4383±9145 | 12317± 10036 | 5968± 8931 | 2858±6880 | 2095± 3574 | 5883±9173 |
| Total costs of social care | Other informal care method | 5009±6332 | 6021±9197 | 15039± 16206 | 7383± 13686 | 9186±12291 | 8933±11754 | 4942±9975 | 15426± 11350 | 6248± 9051 | 2966± 7093 | 2489± 4277 | 7270±10717 |
| | Base-case | 4400±5594 | 5210±8350 | 13859± 15661 | 6368± 11376 | 7797±11289 | 7420±10688 | 4418±9186 | 15251± 11368 | 5968± 8931 | 2858±6880 | 2095± 3574 | 6507±10016 |
| Total costs | Other informal care method | 5124±6333 | 6190±9196 | 15206± 16180 | 7531± 13697 | 9808±12718 | 9247±11819 | 5450± 10288 | 16069± 11592 | 6275± 9071 | 3023±7116 | 2556± 4340 | 7513±10846 |
| | Base-case | 4514±5593 | 5378±8354 | 14026± 15641 | 6516± 11376 | 8419±11769 | 7733±10736 | 4925±9539 | 15894± 11615 | 5995± 8951 | 2915±6902 | 2162± 3640 | 6750±10154 |
| | Difference | 14% | 15% | 8% | 16% | 16% | 20% | 11% | 1% | 5% | 4% | 18% | 11% |

# Section 8. Discussion

Around the world, the proportion of people aged 65 years and over has been increasing in recent years (Trabucchi, 1999). Dementia is one of the most important diseases among older people. Dementia has no cure and, therefore, the focus is on appropriate care and support for people with the condition. Providing care for a person with dementia is difficult and complex and the care burden is shared by nursing homes, hospitals, health professionals and family caregivers. However, the relative burden among these is different for developing and developed countries. It is clear that dementia has resulted in a substantial economic burden on society (Cotter, 2007). Undertaking a cost-of-illness study can identify areas in which costs may be saved if there is an intervention to reduce the prevalence of the disease, or to reduce severity or slow down progression and these studies can highlight the absence or insufficiency of research investment on dementia by governments (Lowin et al., 2001).

Currently, most evidence about the cost of dementia has come from high income countries, and information from low and middle income countries (LAMICs) has just started to accumulate. This thesis described the cost of care received by people with dementia in seven LAMICs in Asia and Latin America, estimated the cost that was attributable to dementia itself, and identified predictors of the cost. Results from the thesis can contribute to the current knowledge of dementia costs in LAMICs, and help people in those settings to consider how to allocate limited resources. The thesis also discussed methodological issues encountered when making cost estimations which may be a useful reference for future studies.

## 8.1. Summaries of the cost estimation in this study

In the study, cost was divided into the cost of medical care and the cost of social care. Social care consisted of informal care and paid home care. Cost was reported in international dollars (I$) for the year 2008 using a private and public perspective.

Information on health service utilisation was collected in the 10/66 survey. Out-of-pocket expenses incurred when using services and real income lost by caregivers were used as unit costs at the private level. At the public level, the use of

UK unit costs and out-of-pocket expenses were combined to estimate the direct medical cost, and the human capital approach based on average wages was used to value the indirect cost incurred by carers.

Information on informal care provided for ADL, IADL, and supervision and paid home care was collected in the survey. The human capital approach was used to value informal care, again based on average wages. Minimum wages were used as the unit cost of paid home care. Two potential alternative methods for estimating the cost of medical care, and five alternative methods for informal care were addressed in sensitivity analyses.

*Characteristics of participants with dementia and their carers*

Most of the people who had dementia were female, were in the older age groups, and had lower educational levels than those without dementia. They were less likely to be employed and also less likely to have income, a pension or private health insurance. They had higher levels of disability and dependency, and therefore, needed more social care. All of these factors highlight the importance and urgent need for the provision of help for these people.

Most of the carers of the participants with dementia were female, except in rural China. Carers were usually of working age, but most did not have a job. Most of the carers were children, children in law or other relatives, rather than spouses. This indicates that the care burden is substantial because of the impact on work. It is implies that older partners/spouses may have difficulties in dealing with the problems, or they may also need to be recipients of care.

*Total cost of dementia*

In this study, both costs for the general population (looking at the sample as a whole) and the specific costs of dementia were calculated. The results show the per capita total cost of care among the older general population is I$660 at the private level, and I$1183 at the public level. The costs increase to I$1887 at the private level and I$6750 at the public level for people with dementia. The increase at the private level is mainly due to the higher costs of informal care and paid home care. At the public level, although there is an increase in the cost of paid care, the increase in total costs

is more related to informal care. Dementia does not lead an increase in medical care costs. It is chronic physical diseases which increase medical care costs and this also influences the cost of social care.

The result that participants with dementia have higher costs than those without dementia is consistent with findings from other studies, even those not based on population samples. For example, a Sweden study (Nordberg et al., 2007) investigated institutionalised patients and found those with dementia had 30% higher costs than those without dementia, mainly because of functional dependency. A study of nursing home care (O'Brien and Caro, 2001) also indicated that dementia patients had higher costs due to extra hours of care.

However, the direct comparison of our results with findings from other studies is quite difficult. This is mainly because of variations in the methodologies used across these studies. The figures are usually presented for different years or in different currencies, but this can be resolved by converting to international dollar based on PPPs, and to same year according to CPIs. However, the range of resources measured in studies, methods of valuing the cost, and sources of data (from community or clinic samples) are often different, which means we need to be cautious about comparisons.

Nevertheless, some comparisons can be made with the findings from the study by Wimo and colleagues which made worldwide estimations of the costs of dementia. This study included both direct costs and informal care costs, and provided estimates for most countries in the world. In the latest worldwide report (Wimo et al., 2010), figures were reported at the country level for 2009, but no data were available for Cuba and the Dominican Republic. However, in their earlier report, information was available for these two countries. The costs from the two reports can be converted to 2008 prices based on the CPIs listed in Table 3.6a. The comparison is shown in Table 8.1. In order to facilitate this comparison, those cost not included as informal care are combined together as the direct cost.

At an individual level, it is shown that the current study makes lower estimates for direct cost in all countries, with the biggest difference in India (96%), followed by

Mexico (91%). Except for the Dominican Republic and Venezuela, the current study makes higher estimates of the costs of informal care, with the biggest difference in Peru (79%), followed by China (60%). The reason for the lower estimation of the cost of medical care in this thesis is because the data were from a community sample, while Wimo et al's study also considered people with dementia who were not living at home. Usually those patients have higher direct costs because of specialist treatments or institutionalisation. The higher estimate of the costs of informal care in most countries may be the result of differences in what time to include. In the estimates of Wimo et al, only ADL and IADL were included in informal care costs, while in this study supervision time is also considered. If looking at Wimo et al's earlier estimation for the year 2005 (Wimo et al., 2007), which included supervision, the informal care time doubled. If that were again the case, the costs here would be lower than those of Wimo et al.

The reason for the lower estimates of the cost of informal care in the Dominican Republic and Venezuela may be because of the CPI increased sharply in the most recent years in the two countries. In 2005, Wimo et al reported less difference in the cost of informal care across the countries, while bigger differences can be deduced from the 2009 report. For example, the average cost of informal care in Venezuela in 2005 was I$9700. After adjustment based on the CPI, the figure increased to I$17,198 for the year 2008. While in other countries with slower inflation, the figures would not highly increase. Therefore, the feasibility of applying PPPs to a country with higher inflation need to addressed in the future. There is other evidence supporting this hypothesis. The costs of informal care in 2009 were only I$17,411 in the UK (CPIs from Table 3.6a) and I$13,179 in Sweden. Both of these costs are lower than the estimation for Venezuela (I$22,075), and this results in similar estimations of total costs in the three countries (I$27,402, I$28,208 and I$32,079 for Sweden, Venezuela and the UK separately). The results are problematic as Venezuela can not be considered similar to Sweden or the UK.

Comparisons of the costs at the population level are more complicated, as these are also influenced by the prevalence of dementia. However, it is clear from Table 8.1, that fewer people with dementia were estimated by Wimo et al in the Dominican Republic, Cuba and India compared with the findings of the 10/66 study. Therefore,

**Table 8.1. Comparison of costs derived from Wimo et al and the current study**

| Country | Source | Number of people with dementia | Direct cost | | Informal care | | Total cost | |
|---|---|---|---|---|---|---|---|---|
| | | | Country level (millions I$) | Per capita (I$) | Country level (millions I$) | Per capita (I$) | Country level (millions I$) | Per capita (I$) |
| Cuba | Wimo-2005[1] | 86,543 | 132 | 1525 | 225 | 2600 | 357 | 4125 |
| | Wimo-2008[2] | - | 151 | 1744 | 257 | 2972 | 408 | 4716 |
| | 10/66[3] | 147,840 | 52 | 350 | 616 | 4164 | 667 | 4514 |
| Dominican Republic | Wimo-2005[1] | 26,686 | 76 | 2848 | 360 | 13490 | 436 | 16,338 |
| | Wimo-2008[2] | - | 96 | 3597 | 455 | 17037 | 551 | 20,634 |
| | 10/66[3] | 71,280 | 56 | 787 | 327 | 4591 | 383 | 5378 |
| China | Wimo-2009[3] | 6,692,787 | 23,638 | 3532 | 40,568 | 6061 | 64,206 | 9593 |
| | Wimo-2008[2] | - | 23,796 | 3555 | 40,839 | 6102 | 64,635 | 9657 |
| | 10/66[3] | 6,888,440 | 14,857 | 2157 | 67,353 | 9778 | 82,210 | 11,934 |
| India | Wimo-2009[3] | 3,165,827 | 6095 | 1925 | 7605 | 2402 | 13,670 | 4318 |
| | Wimo-2008[2] | - | 5511 | 1741 | 6876 | 2172 | 12,360 | 3904 |
| | 10/66[3] | 5,229,315 | 329 | 63 | 12,590 | 2408 | 12,919 | 2471 |
| Mexico | Wimo-2009[3] | 486,521 | 2580 | 5303 | 2478 | 5093 | 5058 | 10396 |
| | Wimo-2008[2] | - | 2451 | 5037 | 2354 | 4838 | 4804 | 9875 |
| | 10/66[3] | 581,580 | 267 | 459 | 3441 | 5917 | 3708 | 6376 |
| Peru | Wimo-2009[3] | 108,962 | 322 | 2955 | 654 | 6002 | 968 | 8884 |
| | Wimo-2008[2] | - | 313 | 2872 | 636 | 5833 | 941 | 8634 |
| | 10/66[3] | 143,964 | 281 | 1952 | 1504 | 10,446 | 1785 | 12,397 |
| Venezuela | Wimo-2009[3] | 99,616 | 612 | 6144 | 2199 | 22075 | 2810 | 28,208 |
| | Wimo-2008[2] | - | 476 | 4777 | 1710 | 17165 | 2185 | 21,935 |
| | 10/66[3] | 103,230 | 123 | 1187 | 747 | 7232 | 869 | 8419 |

1 Number of people with dementia and costs at country level are from Wimo, A., B. Winblad, et al. (2007). "An estimate of the total worldwide societal costs of dementia in 2005." Alzheimers Dement 3(2): 81-91.

2 Costs are converted based on CPIs in Table 3.6a.

3 Number of people with dementia and costs at country level are from Wimo, A., B. Winblad, et al. (2010). "The worldwide societal costs of dementia: Estimates for 2009." Alzheimers Dement 6(2): 98-103.

even if the two figures for the total cost were similar (such as with India), it can not be concluded that the costs estimated by the different studies are directly comparable.

Among the 10/66 project countries, only in China has there been a cost-of-illness conducted (in Shanghai, a metropolitan city), in 2006 among AD patients recruited from clinics (Wang et al., 2008). Only costs related specifically to AD were calculated. Informal care (termed as an indirect cost in the original paper) was valued according to the replacement cost method. The results showed the direct cost to be US$1058 and the indirect cost was US$1326. For comparison with the findings from this thesis, these figures were first converted back to local currency units based on the exchange rate provided in the study (1 USD = 7.97 RMB), and then converted to the I$ based on PPPs (Table 3.5b) and CPIs (Table 3.6a). After conversion, the two figures were I$2700 and I$3385 for the year 2008 respectively. In this study, the cost for medical care was estimated to be I$643 in urban China, which is much lower than Wang's report. This is because samples were from clinics, so greater medical costs occurred than for people living in the community. The cost of informal care in urban China in this study is I$3848, which is very similar to Wang et al's estimation. This is despite Wang et al not including supervision.

A study was conducted in Argentina (Allegri et al., 2007), which can be used for comparison with the project Latin American countries, as the Argentina study also used 10/66 questionnaires. The study recruited 80 people with dementia from the community, 20 from institutions, and 25 people without dementia. In this study, direct costs refer to the costs of medical care and indirect cost is the cost of informal care. Direct costs were estimated by subtracting the cost of healthy controls from the cost of patients. Indirect costs were valued based on the replacement method. For comparison with this study, the costs of patients from the same setting (the community) were focussed on. The annual direct costs were US$797 and the cost for informal care (termed as indirect cost in the paper) was US$3189 in the year 2001. For comparison, these figures were converted to local currency units based on the exchange rate provided in the study (1 Argentine peso = 1 US dollar in 2001), and are then converted to the I$ based on PPP (1 in 2001, from WHO Global Health Expenditure Database http://apps.who.int/nha/database/DataExplorerRegime.aspx) and CPIs (98.9 in 2001 and 211.9 in 2008, from LABORSTA http://laborsta.ilo.org/).

After conversion, the two figures are I$1708 and I$6833 respectively. In this study, the attributable costs of medical care are very low in Venezuela (I$296) and Mexico (I$16), and negative in other Latin American countries (Cuba, the Dominican Republic and Peru). Even if looking at the absolute cost of medical care, the costs estimated from this study (ranging from I$114 in Cuba to I$622 in Venezuela) are lower than Argentina. The result is difficult to interpret. Possible reasons for the large difference may be there was a selection bias in the Argentinean study as the sample size was relatively small, or they may have been selected from cases who visited hospitals/clinics. In this study, the average costs of informal care among participants with dementia in Latin American countries were I$2666 and ranged from I$1030 in rural Mexico to I$4791 in urban Peru. If the Argentinean study included supervision time within informal care costs, then the difference between Argentina and other Latin American countries would be larger. The large difference can be explained by a heavier care burden among carers in Argentina. The daily amount of help for ADL and IADL was eight hours in Argentina, but only about two to five hours in the project Latin American countries (Table A1.2 in Appendix).

Although comparability is limited, there is evidence of greater dementia costs in high income countries than in LAMICs. Jonsson and Berr have reviewed evidence from eight countries and found the total cost per AD patient was from 6000 PPP-adjusted Euros in France to about 19,000 PPP-adjusted Euros in Finland in 2004 (Jonsson and Berr, 2005). A subsequent review (Jonsson and Wimo, 2009) of 15 European studies estimated the median total costs of AD to be 28,000 Euros in 2005 and the cost that was specifically attributable to AD was about 21,000 Euros. Although the figures were presented in Euros, it is still clear that the total cost is higher in these countries than the estimations from this study.

*Cost of medical care*

Findings from this study indicated that dementia does contribute to an increase in the costs of medical care at the public level, but has a mild impact at the private level. However, current evidence from high income countries indicated dementia is associated with higher costs of medical care. A Danish study (Andersen et al., 2003) followed up 114 dementia patients and 351 people without dementia persons and found that health care costs (including medical care, prescriptions and home care)

increased for dementia patients, particularly when the disease progressed. Decline of functional abilities also had an important impact on health care costs. Bynum's study (Bynum et al., 2004) on a nationally representative 5% random sample of Medicare recipients in the US showed that higher Medicare expenditures were related to dementia particularly through increased hospitalisation. Hill and colleagues (Hill et al., 2005) also found hospital admissions were important drivers of the cost of health care among dementia patients. Results showed that VD patients have the most expensive annual costs due to higher admission rates. In another paper, they also reported that functional impairment was highly associated with cost (Hill et al., 2006). A study from Taiwan (Kuo et al., 2010) compared the costs of patients living at home and those in institutions and found that the direct costs of institutional care (including medical care and other non-medical costs) were higher than those of home care.

It appears that hospital admissions, prescriptions and professional home care contribute to increases in the cost of medical care among people with dementia in high income countries. This emphasises the 'treatment gap' of dementia in LAMICs. As indicated in the World Alzheimer Report 2011 (Prince et al., 2011b), most people with dementia are not diagnosed and have no access to treatment. The gap is much greater in LAMICs than high income countries. Our study is based on community living patients from LAMICs and most of them were never diagnosed with dementia. This seems a valid reason for the lack of a noticeable impact on the costs of medical care.

*Cost of social care*

Social care, either provided by professionals or unpaid family members, is clearly important for people with dementia. Findings from this study highlight the high costs of social care. Evidence from high income countries also confirms the importance of such care. The ICTUS study in 12 European countries (Gustavsson et al., 2010; Reynish et al., 2007) collected cost information from 1385 AD patients attending specialist memory clinics. The results showed that only 16% of cost resulted from direct medical care, and the rest was distributed across informal care (54%) and community care (30%).

Although institutionalisation or living in nursing homes is one of the important types of care received by people with dementia, informal care is also a key component of social care (Kirchner et al., 2000). An Italian study carried out in 1995 (Cavallo and Fattore, 1997) showed that unpaid family care was more important than paid-for non-medical services for dementia patients. However, this information was collected by mailing questionnaires to caregivers who sought help and the response rate was very low (28.2%). Caregivers with higher burdens of care might be more likely to consult professionals and respond to the survey, which might have led to higher estimates of informal care costs.

In 2001, Rice and colleagues (Rice et al., 2001) reviewed cost evidence from the US and their results showed that the cost of informal care was about 0.5 to 1.5 times that of formal care. This result would indicate that formal and informal care make similar contributions to social care costs in high income countries. However, an American project (Stommel et al., 1994) found that in 1989 'unpaid labour' accounted for 71% of family care costs among people with dementia. This suggests that economic status may influence the proportion of cost accounted for by formal and informal care. This finding has been reinforced by the current study. Urban Peru and urban China have higher costs of paid home care among all the sites, while the less developed areas have less or even no paid home care. The cost of paid home care does not account for a large proportion of the cost of social care. This is to some extent because of the valuation process for these components of the study. Paid home care is valued according to the minimum wage, while the cost of informal care is calculated according to the average wage. Nevertheless, if comparing the relative weekly hours of paid home care and informal care (see Table A1.2. and Table A1.3.), it is clear that participants received much more informal care than paid home care except in urban China. Care costs for participants in this site were nearly equally shared by the two types of social care.

This may be an increasing trend in the near future, when carers may have more money to spend matters other than basic living needs. When the cost of hiring a paid carer is lower than the earnings they make, they may not need to stop or to cut back from work to provide care. Moreover, evidence has showed that informal care does not save money at a societal level. A Taiwanese study (Chiu et al., 1999) compared

the cost of family-based care and nursing home care for dementia patients. Care costs of family members were valued according to similar caregiving tasks provided by hospital health aides. The results showed that the costs of family-based care were much higher than the costs of nursing home care.

*Differences in the cost of dementia among 10/66 project sites in relation to local health care and economic systems*

The patterns of care costs in the 10/66 sites are not same. Interpretation of the findings is easier if local policies and the characteristics of the economic and health care systems are considered. Some key differences in the cost of dementia among study sites are presented in Table 8.2, in terms of use of medical care, provision of informal care, value of informal care and the use of paid home care.

Peru has a relatively low use of medical care in both urban and rural sites, while Cuba, the Dominican Republic and urban China have relatively high use of medical care. That may be because of differences in ability to access services (see Table 2.7). Cuba, the Dominican Republic and urban China have easier access to primary care centres and these are usually located close to home. In Peru, primary care centres are located at about 5 kilometres away, so it might be difficult for older residents, especially dependent dementia patients, to travel to these centres. However, in India, although it is not easy to access the primary health care service, the use of medical care is not particularly low. The organisation of the health care system in India may explain this finding, as in India all residents can receive basic free medicine (see Table 2.5).

In India, both urban and rural areas have a low provision of informal care. Perhaps surprisingly, rural areas in each country have lower provision of informal care compared with urban are. This may be the result of lower educational attainment for people living in rural areas. Dementia may be considered as part of the normal aging process, because of a lack of knowledge about the condition, and so patients with dementia may not be considered as more dependent. Table 2.2 shows that India has the shortest expected duration of school education. Similarly, in China, Mexico and Peru, rural populations have a lower educational level than urban populations.

**Table 8.2. Key differences in the cost of dementia among 10/66 study sites**

| Sites | Use of medical care | Provision of informal care (public level) | Value of informal care (public level) | Use of paid home care (public level) |
|---|---|---|---|---|
| China urban | High use at private level and moderate use at public level | High | High | High |
| China rural | Moderate use at private level and moderate use at public level | Moderate | Moderate | No |
| Cuba urban | High use at private level and moderate use at public level | Moderate | Moderate | Moderate |
| Dominican Republic urban | High use at private level and moderate use at public level | Moderate | Moderate | Moderate |
| India urban | Moderate use at private level and moderate use at public level | Low | Low | No |
| India rural | Moderate use at private level and high use at public level | Low | Low | No |
| Mexico urban | Moderate use at private level and high use at public level | Moderate | Moderate | Low |
| Mexico rural | Moderate use at private level and high use at public level | Low | Moderate | Low |
| Peru urban | Low use at private level and low use at public level | Moderate | High | High |
| Peru rural | Low use at private level and low use at public level | Low | Moderate | Moderate |
| Venezuela urban | Moderate use at private level and moderate use at public level | Moderate | Moderate | Moderate |

Urban China and urban Peru have a higher value of informal care and a higher use of paid home care. The value of informal care is calculated based on the use of informal care and the average wage. Earnings data and the decision to hire somebody else to provide home care are related to economic wealth. China and Peru have quite large urban and rural differences in terms of economic development (see Table 2.4). This may explain the urban and rural difference in the value of informal care and the use of paid home care.

Table 2.5 shows that the urban populations generally have better health protection and pension coverage compared with the rural populations. This can be confirmed by the findings from Table 8.2. If the rural areas are combined together, and compared with the urban areas – with the exception of India – then the urban areas seem to have higher costs of dementia because of the higher use of medical care, more provision of informal care and more use of paid home care. However, the urban and rural comparison is quite limited by the fact that other key differences (e.g. in terms of the economic system, pension systems and structure of health care systems) exist. Future analyses should consider these urban-rural differences more fully.

*Subtype and cost of dementia*

The subtype of dementia was not entered into the linear regression models. This is because some sites (particularly India and rural Mexico) have high proportions of non-recording of certain subtypes. However, descriptive analyses reveal that pure VD has the highest cost of medical care among the different subtypes. Total costs among pure VD and mixed AD/DLB are higher than for other types of dementia

These results contribute to the knowledge that VD results in higher medical costs. Fillit and Hill compared the cost of VD patients, AD patients and controls without dementia based on community care homes and found the costs for VD were higher than for AD, which was mainly due to higher inpatients cost among VD patients (Fillit and Hill, 2002). A population-based study in Spain (Sicras et al., 2005) also showed that patients with VD had higher medical costs and total costs than patients with AD. Similar results were found in a study by Wimo and Winblad, in which costs from a societal level were compared (Wimo and Winblad, 2003).

By briefly reviewing these previous findings, it seems that VD increases the cost of medical care, mainly because of the higher admission rates to hospitals. Evidence from Argentina (Rojas et al., 2011) supports this hypothesis. That study showed there was no significant difference in the annual direct costs among AD, VD and FTD, but post hoc analyses indicated that VD had higher hospitalisation costs than AD, but had lower medication costs than FTD.

A study has also revealed that DLB patients may also have higher costs, but not for medical care. Results from a US study (Zhu et al., 2008c) showed unadjusted indirect costs were higher among DLB patients and unadjusted direct non-medical care were significantly lower. However, after adjusting for age, gender, cognitive and functional status, differences were not statistically significant. It is important to conduct further cost comparisons so as to allocate resources appropriately to the patients who need them most.

*Predictors of cost*

Severity is a strong predictor of the cost of dementia, and it particularly influences social care rather than medical care. For example, a Canadian study (Herrmann et al., 2010) followed up 903 mild-to-moderate AD patients in the community for three years. The results showed that total cost had a significant relationship with the severity of dementia. The largest component of the total cost among the most severe patients was informal care. Hux and colleagues investigated 750 probable or possible AD patients in the community and people in long term care institutions in Canada and found that the cost of patients for severe dementia was four times that for mild dementia (Hux et al., 1998). The cost of unpaid care was the largest component for patients with mild dementia, while the cost of institutionalisation was the largest cost for severe patients.

In this study, the possible association between more specific symptoms and costs were investigated. The results show that memory loss was the only one to not significantly predict cost, while other cognitive impairments and BPSD have a clear association with costs of informal care and social care. However, they did not influence the cost of medical care.

This finding is in agreement with other studies. Information from a nationally representative survey of people age 70 years and over in the US (Langa et al., 2001) showed, after controlling for socio-demographic factors and comorbidities, that informal care time increased with the severity of cognitive impairment. A study on Vascular Cognitive Impairment (VCI) in older adults (Rockwood et al., 2002) clearly demonstrated the positive association between cognitive impairment and higher societal costs. Another US study (Okura and Langa, 2011) suggested that patients with three or more neuropsychiatric symptoms had significantly increased hours of active help and supervision. Herrmann and colleagues investigated 500 caregivers of community living dementia patients and found there was a significant association between costs and BPDS (Herrmann et al., 2006). Elsewhere, it has been found that 30% of the total cost of AD was related to the management of BPSD (Beeri et al., 2002b).

Cognitive impairment and BPSD may directly leads to more need for help with ADLs. A study carried out in Spain, Sweden, the UK, and the US (Gustavsson et al., 2011) confirmed the hypothesis that the ability to perform ADL was the most powerful predictor of costs for community residents in all countries.

The results showed that diabetes, stroke, and other physical impairments predicted higher costs of informal care, social care and total costs at the public level, and stroke also predicted higher medical costs. Many studies report similar findings. The Taiwanese study (Kuo et al., 2010), which compared the costs of patients living at home and those in institutions, also indicated that indirect costs, including unpaid care, were greater among community dwelling patients and had a significantly positive association with the physical dependence of the patients. An earlier study in Sweden (Svensson et al., 1996) showed that functional disability was highly associated with higher staff density and higher labour costs, which lead to higher costs overall. A US study (Murman et al., 2003) showed clear evidence that AD patients with Lewy Bodies or parkinsonism had higher costs than patients with AD only. In brief, physical diseases/impairments influence both medical care and social care costs (particularly with regard to informal care).

Gender, age, and marital status usually were included as independent variables in the

regression models. Few studies have detected significant impacts on costs of these factors. For example, Zhu et al carried out a study on longitudinal changes of informal care costs for people with AD in the community (Zhu et al., 2006a). No difference was detected among patients with different demographic factors. However, some studies do have significant findings. For example, Lopez-Pousa et al found gender and marital status of patients to be associated with total costs (Lopez-Pousa et al., 2004). In this study, older participants with dementia, those with a higher educational level, those not living alone and those with younger carers had higher costs of informal care and social care and total cost. Male participants had lower costs of paid home care and social care and lower total cost. Participants with male carers had higher costs of medical care. Higher economic status predicts higher cost of paid home care and out-of-pocket expenses. The findings here emphasise the importance of identifying socio-demographic predictors of cost, so that help can be provided to those needing it the most.

*The attributable cost of dementia and other diseases*

As described above, physical comorbidity is one of the predictors of costs, both of medical care and social care. Other psychiatric comorbidities also influence the cost. A US-based study of a Veterans Affairs medical centre investigated 864 dementia patients from a cohort of 960 patients indentified in 1997 (Kunik et al., 2003). The study compared costs between patients with psychiatric comorbidities and those without. Results showed that comorbidities were highly related to higher costs for health service use.

As described in Section 1, the 'net cost', or the attributable cost can be calculated by 'subtracting method' or 'regression method'. This study used the latter because matching with a control with similar socio-demographic characteristics and physical or mental status is challenging. Potential predictors, including other physical and mental diseases, were entered into regression models. The results showed that the attributable cost of dementia at the public level was I$5164 in the sample as a whole, ranging from I$1764 in India to I$10,332 in Peru. The attributable costs increase with the progress of dementia, but only for social care and total cost, not for medical care. A decrease of I$1587 (24%) can be treated as the increased cost caused by other conditions (Table A4.1 in Appendix). The rates vary from 15% in Cuba to 58%

in Venezuela. In all countries, the increase in cost is due to the impact on social care (particularly informal care), rather than medical care.

The regression model also shows the attributable costs of other mental and physical diseases. The results show that dementia has higher attributable costs than those of other chronic diseases in these countries except India, but again only for social care and total cost, not for medical care. This finding is consistent with a UK study (Livingston et al., 1997). The study compared the cost of formal community services among people with dementia, depression, anxiety disorders and physical disabilities and found that dementia was the most expensive disorder because of the largest use of community care. Although the UK study did not address informal care, the care need increased clearly among dementia patients compared with persons with other diseases or disorders.

These findings do not support the view that dementia adds more to the cost of medical care compared with other chronic diseases. By contrast, a study on Medicare Program expenditures in the United States found dementia or frailty added more costs of hospitalisation than other organ system failure, such as diabetes and chronic obstructive pulmonary disease (Campbell et al., 2004). This can be explained by the differences in care arrangement between high income countries and LAMICs. The care need in the above study was increased, but shared with hospitalisation.

In this study, stroke was highly associated with the cost of medical care in most countries, and related to informal care in all countries except Venezuela. In India, stroke had the highest attributable cost, again mainly with regard to the cost of informal care, while dementia was the second highest cost disease. This is probably the result of high rates of unidentified dementia in India (Prince et al., 2011b). Carers may pay more attention to stroke as it is much easier to identify, while dementia may be misunderstood as normal aging.

Depression is associated with higher costs of informal care. This finding is in agreement with a Germany study (Luppa et al., 2008). This showed that higher cost was associated with more depressive symptom and more chronic diseases. However,

no information was included on the cost of informal care in that study. In China, the increase of informal care costs due to depression is higher than that of dementia and stroke. Further research is warranted as China has the lowest prevalence of depression (Table 2.10) among study countries. However, the reliability of this finding needs to be considered as cases of stroke in India, and cases of depression in China are very few. The current findings might be because of sampling errors.

Interestingly, hypertension, the most prevalent chronic disease detected in this survey, has a negative association with the cost of informal care and paid care in China, and does not increase cost in other countries except Peru. In Peru, the cost of medical care increases in the presence of hypertension. This overall finding suggests that patients with hypertension may have lower disability and therefore do not need further care. Another reason may be that there is less awareness and control of the disease (Prince et al., 2012b). Patients do not always know they have hypertension and so carers may not provide extra help for them.

Diabetes increased the cost of medical care and informal care in the sample as a whole, but had different impacts across the counties. In Cuba, ischemic heart disease decreased the cost of informal care, paid care and total cost. COPD increased the cost of informal care in China, but decreased the cost of informal care in Dominican Republic. This may be because of cultural differences between the two countries. However, more research should be implemented to give a better explaining of these phenomenons.

The attributable cost of dementia is finally presented at a country level and calculated as the percentage of GDP in that country to make it comparable with the World Alzheimer Report. The report shows that the worldwide cost is equivalent to about 1% of global GDP, varying from 0.24% in low income countries, 0.35% in low-middle income countries, 0.5% in high-middle income countries, and 1.24% in high income countries. This study showed the attributable costs of dementia are equivalent to between 0.1% and 1.2% of GDP in the project countries. According to the World Bank classification (World Bank, http://data.worldbank.org/about/country-classifications), only India in this study is classified as a low-middle income country, with other countries classed as

high-middle income countries in 2011. Therefore, the combined rate for high-middle income countries in this study (except India) is 0.6%, and for low-middle income countries (only India) is 0.3%. For comparison with Wimo's result, the crude costs of dementia were calculated in Table A4.2 in Appendix. The figures are 0.9% for high-middle income countries, and 0.4% for low-middle income countries. The current estimation of GDP equivalence is similar with Wimo's report. A Korean study also gave different figures, reporting a GDP equivalence of 0.5% to 1% in 2004 (Kim et al., 2009). However, it is not appropriate to compare these directly, as different methodologies and different estimates of the prevalence of dementia were applied.

*Results from sensitivity analyses*

Use of the 'percentage method' was closely linked to out-of-pocket expenses. The influence on costs of dementia was not extensive because participants with dementia use relatively little medical care. The 'GDP-ratio method' led to a similar estimation of cost of medical care and total cost as those produced in the base case analysis.

The '10/66 salary method' and 'replacement cost approach' serve to decrease costs, because these two methods reduce the value of informal care, which is the most important component of total cost. The 'leisure time method' also largely increases or decreases the cost of informal care depending on whether a figure of 50% of earnings or 150% is used. However, these figures are arbitrary because there is no standard value for leisure time. For example, in an Israeli study (Beeri et al., 2002a), leisure time was valued according to minimum wage rates. If this study used the same method, the results would be quite different. The 'carers characteristics method' has the least influences on the cost of informal care and total cost compared to the other three methods. However, this method has the advantage that it is based on information (characteristics of carers) collected from the survey. All these four methods give different estimates of the total cost of care for dementia patents, and this implies that informal care cost is the most important component of total costs.

Use of 'all informal care method' resulted in increases in total cost of about 10%. This shows us the information about informal care should be collected based on all the care received by the older participants, rather than care provided by main

caregivers.

## 8.2. The 10/66 algorithm and the CDR

The diagnosis of dementia in this thesis was made according to the 10/66 algorithm, while the severity of dementia was accessed with the Clinical Dementia Rating (CDR). A previous report (Prince et al., 2008b) showed a discrepancy between the 10/66 algorithm and CDR rating. The 10/66 algorithm confirmed 100% of CDR-rated severe cases, 100% of moderate cases, 98.1% of mild cases and 77.4% of questionable cases. In other words, the 10/66 algorithm also makes diagnoses for those people with questionable dementia identified by the CDR. Therefore, in the results section, when analyzing service use and costs related to severity, those with questionable dementia have been grouped with those who have mild dementia. For comparison, the costs attributable to dementia, by level of severity (with questionable and mild dementia separated), are shown in Table A.5 at the appendix.

Although a disagreement between the 10/66 algorithm and the CDR exists, the 10/66 algorithm is preferable to the DSM-IV system in terms of the diagnosis of dementia as it can detect the early stage of dementia (Llibre Rodriguez et al., 2008), which are more likely to be found in community settings. A key weakness of dementia diagnosis using the DSM-IV system is that it is difficult to operationalise the DSM-IV criteria in a standardised way, which may lead to unsatisfactory reliability. Therefore, compared with DSM-IV, the 10/66 algorithm might be more useful for developed countries in an epidemiological survey because of its easy operation and good reliability.

## 8.3. The quality of the database

The quality of the database can be discussed from the following aspects, including the validity of the instruments, uniformity, data constraints, accuracy and completeness.

The diagnoses of dementia and depression were obtained from detailed clinical

interview, and, in the case of 10/66 dementia, cognitive testing and informant interview. There is now extensive evidence attesting to the criterion and predictive validity of the 10/66 Dementia diagnosis(Jotheeswaran et al., 2010; Prince et al., 2003; Prince et al., 2012a; Prince et al., 2008b), and some support for the validity of the measurement approach used to identify depression(Prince et al., 2004a). Other assessments of physical health (e.g. stroke, and physical impairments) were based mainly on self-report, and may have been subject to under-ascertainment. The version of the Client Service Receipt Inventory (CSRI) used in this thesis was specifically adapted for use in resource poor low and middle income countries (Chisholm et al., 2000b). Other scale-based assessments; of disability (WHODAS 2.0), cognition (CSI-D), and behavioural and psychological symptoms (NPI-Q) in the older person, and informant/ carer mental health (SRQ-20) and strain (ZBI); have all been used and validated in a wide range of countries and cultures, with in several instances, further attention being given to their cross-cultural measurement properties in the 10/66 surveys(Prince, 2004; Sosa et al., 2009; Sousa et al., 2010a).

As described in section 2, all 10/66 centres were extensively trained in the main diagnostic assessments. A standardised manual with detailed information in terms of operational procedures was designed, covering every aspect of the training and field procedures. To maximise standardisation, special training videos were prepared for the Geriatric Mental State clinical interview and the NEUROEX physical and neurological examination. Study PIs were all originally trained by the 10/66 PI, with refresher 'train the trainer' training at project inception, ensuring that research workers in all sites were trained in the same way, and to a similar standard.

During the field study, quality control was maintained by local study coordinators:
1. supervising all initial interviews, and spot-checking interviewer performance later
2. reviewing data entry sheets for completeness and any unusual or questionable data patterns before they were entered into computers
3. holding regular group meetings with interviewers to discuss any difficulties encountered during interviews, and coding problems.

A set of EpiData database files was developed and all centres used the same files to enter the data. Each country had a specific data entry clerk and 100% double entry

was requested, ensuring accuracy during the data entry process. During the design of the EpiData database files, check files were also used to ensure the data constraints (data fall into the right categories) and range constraints (data fall into certain range). The London coordinating centre reviewed early data returns from all sites, and regularly thereafter to check for data quality and completeness.

The London coordinating centre carried out the final processing and cleaning of data from all sites, generating all of the main derived variables (scale scores and diagnostic algorithms for dementia and other mental and physical health conditions), using SPSS syntax command files. Questionable data, and matching errors were checked with local centres and errors corrected where necessary.

All of these steps should have optimised the accuracy, completeness and consistency of data across the 10/66 research centres. The overall response rate was high to very high in all centres, and there was also, in general, a very low proportion of missing values in the dataset.

Therefore, considering the satisfied validity, uniformity, data constraints, accuracy and completeness, the 10/66 database used in this thesis is of a high quality and is suitable to be used for further analysis.

## 8.4. Implications of the study results

By reviewing the results from this study, the following implication can be made:

- People with dementia have specific characteristics that imply social disadvantage (being female, older age, lower education, less likely to have income, pension or private health insurance), and they have high levels of disability and dependency. These highlight the importance and urgent need of providing help for these people.
- Informal care is the most important driver of total cost in LAMICs. Providing care for a person with dementia leads to substantial caregiver burden. Most carers are of working age but do not have a job. Some people with dementia also have BPSD, which may increase the caregiver burden. Therefore, help also

need to be offered to carers.

- Evidence shows that costs may not be greater in a nursing home if we also consider unpaid work (Chiu and Shyu, 2001; Chiu et al., 1999; Kuo et al., 2010). Therefore, non-professional care may be provided at home to release the burden of family caregivers. That may also decrease the total cost of dementia by providing help with IADL or supervision for more than one patient at the same time.
- Chronic diseases contribute to the total cost of dementia. Some diseases increase medical care cost and some of them mainly increase informal care. Early detection and treatment for other chronic disease may decrease the cost of care for these patients.
- Compared with stroke, diabetes, ischemic heart disease and COPD, dementia results in higher social care costs. The patterns of care received may be different between high income countries (more professional care) and LAMICs (more informal care), but the care needs and care burden are similar between the two settings. However, limited funds are available for dementia research both in high income countries (Wimo and Prince, 2010) and LAMICs (Prince et al., 2007). More research fund should be allocated to dementia in the future.
- Although patients with severe dementia have higher average total costs, at a country level the overall cost of mild dementia dominant. Evidence-based intervention should be provided for those with mild dementia, delaying the progression of the condition, so as to decrease the cost of dementia at a country level.
- Results from this study are difficult to compare with findings from other studies. This is mainly due to methodological issues (Bloom et al., 2001) which occur in the various steps of the calculations (identification, measurement, valuation). Future discussion should be made to establish standard methods to guide the conduct of cost-of-illness studies.

## 8.5. Limitations

As mentioned above, the reasons that make comparisons difficult are due to differences in design and methods. Although costs have been estimated for each

participant in this study, some limitations need to be pointed out.

*Identification of cost*

(i) This study is based on a community sample and specific questions were not asked about diagnosis or treatment specifically related to dementia. This may lead to an underestimation of the cost of medical care.

(ii) As this was a community survey, individuals in residential acre were not included. This means the costs for the whole country will be underestimated if based on the costs per person reported here.

(iii) A review (Sorensen et al., 2006) reported that the outcomes of family caregivers of people with dementia included psychosocial and physiological problems, health behaviour and other general health problems. All these could be identified as requiring resources utilisation. However, these costs were not included.

(iv) Although most people aged 65 years and over do not work, there are still some people of this age who have paid work. Our findings show that fewer participants with dementia have jobs than the general population. Some people with dementia stop work because of the disease and this is thus a cost of lost production. This was not though included in the estimates.

(v) Dementia patients have a higher mortality rate than the general population (Ferri et al., 2012). The life years lost should also be considered in the costs of dementia. However, this study is based on a prevalence approach, and only estimates of the cost in one year are made. If the study was based on an incidence approach, these costs should be included.

(vi) When calculating the cost at the country level, research costs were not included.

*Measurement of cost*

(vii) In this study, information about service uses was reported by the participants. This method may be problematic. People with dementia may lack the ability to reliably report service utilisation (Fox, 1997). In order to deal with the problem, this

information was also asked of informants and it was the responsibility of the interviewer to decide which information was more valid. However, the informant also may not accurately report the situation of the older participants. Diagnoses of diabetes, stroke, COPD, or ischemic heart disease are also based on self-report so may not be accurate.

(viii) Care provided by a main caregiver was recorded as the basis of informal care costs. However, the older person may receive help from other unpaid family members. This will lead to a lower estimation for the cost of informal care. This has been shown in sensitivity analyses where an increase of around 10% increase will occur if all informal care is included.

(ix) The recall periods for the information about medical care, informal care and paid home care are different. Health service use during the past three months was asked and annual costs were calculated by multiplying by four. This assumes the costs in the three months are representative of the annual costs, which may not be the case. Informal care costs were based on care provided in the last 24 hours and this also may not be representative. Similarly, paid home care was based on provision during the past week.

(x) Only the *frequency* of time spent providing help for ADL, transportation and paid home care were asked in the survey. Assumptions had to be made to convert these categorical variables to continuous variable.

(xi) Missing values were treated as zero and some outliers were trimmed to avoid using data that appeared to be mistakenly recorded. However, those with missing data may have used the service or received care. Furthermore, individuals may have received some extremely expensive treatments and so the trimming method may result in underestimated costs.

*Valuation of cost*

(xii) The amount of the payments for paid care and the reimbursement rates for medicine were not collected in the survey. Patients may under- or over-estimate the out-of-pocket expenses as they may not recall the reimbursement rate.

(xiii) UK unit costs were used as the basis of the estimates. Although adjustments were made, the structure of services in other countries may be different.

(xiv) The decision was made to use the same value for paid home care workers providing care during the day and night. It may though be the case that rates differ according to the time of day.

## 8.6. Next steps

*Cost of illness studies and evaluation of interventions*

A systematic review was published recently (Oremus and Aguilar, 2011) which addressed cost-of-illness studies in the US and Canada. The authors suggested future research should move from cost of dementia studies to evaluations of dementia programmes. Cost-of-illness studies do provide information on cost patterns in dementia and therefore can be used for generating ideas for future research. However, as dementia has no cure, it may be more important to consider how to allocate current resources to meet the needs of managing dementia.

The above view about cost-of-illness studies may be relevant for developed countries they have been conducted over many. However, going back 30 years, when little was known about the cost of dementia, cost-of-illness studies did provide useful information to encourage people to more attention to dementia. For example, in 1981, a study in the Netherlands (Ringoir and van Duuren, 1981) estimated that the total cost of dementia was about 5% of the total costs spent on health care and 0.4% of national income and this emphasised the need for dementia research. Very few studies have been carried out in LAMICs and so a similar need for such studies may apply.

A further reason for carrying out a cost-of-illness study is that this can identify the costs that may be avoided by implementing efficient prevention programmes (Smith et al., 1995). Nepal et al reviewed evidences from current economic studies on dementia and their implications in Australia (Nepal et al., 2008) and suggested that dementia may be delayed or prevented by interventions and the subsequent costs

could therefore reduced. Cognitive stimulation treatment (CST) (Orrell et al., 2005; Spector et al., 2008) and/or reality orientation for patients, particularly with mild or moderate cognitive impairment, has relatively strong evidence of efficacy (Prince et al., 2011b). 'Helping carers to help' (HC2C) also shows evidence of decreasing caregiver strain (Gavrilova et al., 2009; Guerra et al., 2011). Both CST and HC2C could potentially decrease of cost of dementia.

*Lifetime costs of dementia*

Current cost-of-illness studies usually estimate cost over a defined period. This thesis has reported costs of dementia for 2008. However, these cross-sectional data cannot reflect the dynamic changes during the progression of the disorder over time. Lifetime costs can also be modelled and this information is useful for comparing the monetary effects of different treatment programmes in the future. Lifetime costs could be estimated based on a cross-sectional study by dividing the sample into age groups or severity groups (the two will be highly correlated) and by examining costs for each to estimate the change in costs that is likely to happen over time.

*Standard guideline for a cost-of-dementia study*

As mentioned earlier, comparisons of results from cost-of-illness studies are difficult because of different designs and methods. A guideline about how to implement a cost-of-illness study in the dementia area would be useful for researchers and facilitate such comparisons. Some suggests are as follows:

- Make clear the cost categories
- Indicate the sample source and sampling methods
- Measure cost using comparable questionnaires
- Provide detailed information of the valuation of the costs
- Apply appropriate statistical methods to deal with data that have excess zeros and do not follow normal distributions
- Convert local currencies to international dollars and make clear the year of the estimates
- Report comprehensive results

# Glossary of terms

| Terms | Definitions |
|---|---|
| 10/66 | Refers to the recognition that 66% of people with dementia live in developing countries while less than one-tenth of population based research has been carried out in those settings. |
| Activities of daily life (ADL) | Routine activities that people tend do everyday. Includes help with dressing, eating, grooming, toileting, and bathing. |
| Assets | Items of economic value owned by an individual or a family. Include televisions, fridges, freezers, mains water, mains electricity, telephones, plumbed toilets and plumbed bathrooms. |
| Attributable cost | The cost which is specifically due to a certain disease or condition. |
| Behavioural and psychological symptoms of dementia (BPSD) | A series of symptoms of dementia. Behavioural problems refer to agitation, screaming, restlessness, wandering, sexual disinhibition, hoarding, or cursing. Psychological symptoms include anxiety, depression, hallucinations, delusions and apathy. |
| Bootstrapping | A statistical method to deal with highly skewed data. |
| Bottom-up method | An approach for costing at the individual level with data aggregated to generate the total cost for a condition. |
| Conditions of Work and Employment Branch (TRAVAIL) | TRAVAIL is a department of the International Labour Organisation (ILO) and provides information on wages, working time, work organisation and maternity protection. One of TRAVAIL's products is a Global Wage Database which provides a comprehensive overview of wage trends in ILO member countries and this information was used in this thesis. (International Labour Organisation, http://www.ilo.org/travail/info/db/lang--en/index.htm) |
| Consumer price index (CPI) | Measures changes in the prices of goods and services that households purchase across years. Such changes affect the real purchasing power of individual's incomes and consequently their welfare. |
| Cost at private level | Family and patient costs, including out-of-pocket expenses and time spent using services and travelling to use them. |

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|---|---|
| Cost at public level | For medical care, this refers to the cost of government funded services. For indirect costs, it implies that values are based on average income rather than individual income lost. |
| Cost-of-illness study | An attempt to measure all the costs associated with a particular disease or condition. This usually includes direct and indirect costs. |
| Dependence | Reliance on or needing someone or something for aid or support. In this thesis, it means the need for care. |
| Direct cost | Materials, labour and expenses related to the provision of a service. |
| Direct medical cost | Direct cost of receiving medical care (e.g. diagnostic assessments, examination and treatment). |
| Direct non-medical cost | Personal direct costs (e.g. transport and time costs). |
| Friction cost approach | A method to value lost production. It is equal to the value of lost working days confined to the period during which labour is replaced. |
| GDP per capita | Gross domestic product divided by population estimates. |
| Global Health Expenditure Database | A database released by World Health Organisation (WHO), which contains internationally comparable numbers on national health expenditures. In this thesis, information of health expenditures and PPPs were used. (World Health Organisation, http://apps.who.int/nha/database/DataExplorerRegime.aspx) |
| Gross Domestic Product (GDP) | 'GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products.' (World Bank, http://data.worldbank.org/indicator/NY.GDP.MKTP.CD) |
| Human capital approach (HCA) | The human capital approach is a method to value lost production, which is assumed to be equal to the lost income as a consequence of disease. |
| Incidence approach | New cases are identified and followed up over a period of time (usually lifetime) to show the cost over the disease course. |
| Indirect cost | Resources lost, including loss of productivity, or other impacts including costs due to being unable to engage in leisure. |

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| Informal care | Care provided by unpaid family members or relatives. |
| Instrumental activities of daily life (IADL) | A series of activities often performed by a person who is living independently in a community setting, but not necessary for fundamental functioning. It includes help with communication and transportation in this study. |
| Labour Statistics Database (LABORSTA) | LABORSTA is a database published by the International Labour Organisation (ILO), providing internationally comparable data on employment, unemployment, wages, hours of work, CPIs, occupational injuries, industrial disputes, household income and expenditure and international labour migration. Wages and CPIs were used in this thesis.( International Labour Organisation, http://laborsta.ilo.org/) |
| Opportunity cost | 'The cost of any activity measured in terms of the value of the next best alternative forgone (that is not chosen).' (Wikipedia, http://en.wikipedia.org/wiki/Opportunity_cost) |
| Low and middle income countries (LAMICs) | Used by the World Bank to classify countries based on population income. (World Bank, http://data.worldbank.org/about/country-classifications) |
| Medical care | Care provided by healthcare professionals. |
| NHS Reference Costs | Costs published regularly by the Department of Health in England which and provide detailed information on an extended range of surgical procedures and medical treatments. (Department of Health, http://www.dh.gov.uk/health/tag/reference-costs/) |
| Out of pocket expenditure | 'Direct outlays of cash which may or may not be later reimbursed.' (Wikipedia, http://en.wikipedia.org/wiki/Out-of-pocket_expenses) |
| Paid home care | Care provided by paid home carers (non-professional help, such as cleaning the house, helping with cooking or other activities of daily life). It does not include professional health workers' home visits. |
| Perspective of costs | The vantage point of a cost-of-illness study. Cost can be estimated from different perspectives and these generate different results. |

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|---|---|
| Prevalence approach | This approach uses cross-sectional data and the cost in one specific year is calculated for people with a specific condition. |
| Purchasing power parities (PPPs) | PPPs are exchange rates which aim to make adjustments to equalise the purchasing power of different currencies and also to enable costs to be compared for different years. |
| Quality-adjusted life year (QALY) | QALY is a measure of disease burden and it presents a year of life adjusted for its quality or its value. It considers both the quality and the quantity of life lived. (Adapted from Wikipedia, http://en.wikipedia.org/wiki/Quality-adjusted_life_year) |
| Replacement cost method | The replacement cost method is one of the methods to value lost production. It values informal care based on what one would have to pay to replace the carers if they were not available. |
| Sensitivity analyses | This is an analysis carried out to determine the impact of making different assumptions about key variables (e.g. a unit cost). |
| Social care | In this thesis, social care only includes informal care and paid home care. It does not include professional home care, respite care or long term institutional care. |
| Top-down method | A costing approach using data collected at a macro or national level (e.g. from national registers) with costs distributed across different conditions. |
| Unit cost | The cost per unit of a particular service. |
| Unit Costs of Health and Social Care | A series of publications funded by the UK Department of Health, updated every year, to provide transparent and comparable information about the costs of health and social care for use in health economic studies. (Personal Social Services Research Unit, http://www.pssru.ac.uk/project-pages/unit-costs/2011/index.php) |
| WHO-CHOICE project | A World Health Organisation (WHO) sponsored project to provide policy makers with information when deciding on which interventions and programmes to provide using limited resources in order to maximise health. Country-level costs and effects of different health interventions are estimated and provided in the WHO-CHOICE report. (World Health Organization, http://www.who.int/choice/en/) |

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| World Economic Outlook Database | A database released by the International Monetary Fund, which contains selected macroeconomic data series from the statistical appendix of the World Economic Outlook report. In this thesis, PPPs, CPIs, and GDP per capita from this database were used. (International Monetary Fund, http://www.imf.org/external/pubs/ft/weo/2011/02/weodata/index.aspx) |

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# Appendix

**Table A1.1. Amount of receiving health service uses in the last 3 months, by site and dementia status**

| Services type by dementia status | Cuba | Dominican Republic | Peru (urban) | Peru (rural) | Venezuela | Mexico (urban) | Mexico (rural) | China (urban | China (rural) | India (urban) | India (rural) | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Primary health centre** | | | | | | | | | | | | |
| Dementia | 0.8±2.0 | 0.2±0.9 | 0.1±0.5 | 0.9±2.8 | 0.3±1.0 | 0.5±1.2 | 0.9±1.7 | 1.1±2.5 | 0.1±0.4 | 0.1±0.6 | 0.4±0.7 | 0.5±1.5 |
| Non-dementia | 1.0±2.1 | 0.3±1.1 | 0.3±1.2 | 0.3±1.1 | 0.4±1.1 | 0.9±1.4 | 0.9±1.5 | 0.7±1.9 | 0.1±0.5 | 0.05±0.4 | 0.2±0.6 | 0.5±1.4 |
| **Hospital doctor** | | | | | | | | | | | | |
| Dementia | 0.5±1.4 | 0.5±1.4 | 0.8±1.5 | 0.4±0.9 | 0.6±1.8 | 0.6±1.4 | 0.3±1.1 | 0.7±1.6 | 0.1±0.5 | 0.1±0.4 | 0.4±1.1 | 0.5±1.4 |
| Non-dementia | 0.5±1.4 | 0.6±1.5 | 1.0±2.0 | 0.5±1.5 | 0.5±1.4 | 0.6±1.4 | 0.2±0.8 | 0.6±1.4 | 0.03±0.3 | 0.2±0.8 | 0.4±1.1 | 0.5±1.4 |
| **Other government health worker** | | | | | | | | | | | | |
| Dementia | 0.3±1.5 | 0.1±0.7 | 0 | 0 | 0.2±1.1 | 0.02±0.1 | 0.1±0.8 | 0.1±1.3 | 0 | 0.04±0.3 | 0.5±1.7 | 0.2±1.1 |
| Non-dementia | 0.4±2.0 | 0.1±0.8 | 0.1±0.8 | 0.03±0.5 | 0.1±0.8 | 0.2±1.1 | 0.2±1.2 | 0.001±0.03 | 0.001±0.03 | 0.01±0.1 | 0.2±0.7 | 0.2±1.1 |
| **Private doctor** | | | | | | | | | | | | |
| Dementia | 0 | 0.4±1.0 | 0.2±0.9 | 0.1±0.4 | 0.5±1.1 | 0.6±1.2 | 0.3±0.9 | 0 | 0 | 0.4±1.1 | 0.8±1.4 | 0.3±0.9 |
| Non-dementia | 0.01±0.2 | 0.4±0.9 | 0.3±0.9 | 0.02±0.2 | 0.6±1.2 | 0.3±0.9 | 0.4±1.0 | 0.01±0.2 | 0.01±0.2 | 0.4±0.9 | 0.6±1.1 | 0.3±0.8 |
| **Dentist** | | | | | | | | | | | | |
| Dementia | 0.02±0.2 | 0.03±0.3 | 0.02±0.1 | 0.1±0.4 | 0.1±0.5 | 0.1±0.6 | 0 | 0 | 0 | 0 | 0 | 0.03±0.3 |
| Non-dementia | 0.1±0.5 | 0.1±0.6 | 0.2±0.8 | 0.04±0.4 | 0.2±0.7 | 0.2±0.8 | 0.1±0.4 | 0.03±0.3 | 0 | 0.002±0.05 | 0.04±0.2 | 0.1±0.5 |
| **Traditional healer** | | | | | | | | | | | | |
| Dementia | 0.01±0.1 | 0.004±0.1 | 0 | 0 | 0 | 0.1±0.4 | 0.1±0.3 | 0 | 0 | 0 | 0.1±0.4 | 0.02±0.2 |
| Non-dementia | 0.01±0.2 | 0.002±0.05 | 0.01±0.2 | 0.03±0.3 | 0.01±0.2 | 0.04±0.4 | 0.1±0.6 | 0.01±0.3 | 0 | 0.002±0.05 | 0.1±0.4 | 0.02±0.3 |
| **Admitted to hospital** | | | | | | | | | | | | |
| Dementia | 0.2±1.7 | 0.2±1.1 | 0.1±1.1 | 0 | 0.3±2.6 | 0.01±0.1 | 0.2±1.3 | 4.1±17.9 | 0 | 0.5±3.5 | 0.1±0.3 | 0.4±4.8 |
| Non-dementia | 0.2±1.7 | 0.2±1.9 | 0.2±1.7 | 0.1±1.1 | 0.2±1.6 | 0.1±1.6 | 0.1±0.7 | 0.5±4.3 | 0.1±0.9 | 0.1±0.8 | 0.04±0.4 | 0.2±1.9 |

**Table A1.2. Hours of receiving informal care per day, by site and dementia status**

| Services type by dementia status | Cuba | Dominican Republic | Peru (urban) | Peru (rural) | Venezuela | Mexico (urban) | Mexico (rural) | China (urban) | China (rural) | India (urban) | India (rural) | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **ADL** | | | | | | | | | | | | |
| Dressing | | | | | | | | | | | | |
| Dementia | 0.7±0.9 | 0.4±0.7 | 0.5±0.6 | 0.4±0.7 | 0.2±0.5 | 0.3±0.6 | 0.2±0.5 | 1.0±1.0 | 0.6±0.9 | 0.2±0.6 | 0.3±0.4 | 0.5±0.8 |
| Non-dementia | 0.02±0.2 | 0.04±0.3 | 0.03±0.2 | 0.02±0.1 | 0.01±0.2 | 0.03±0.2 | 0.02±0.2 | 0.1±0.4 | 0.01±0.1 | 0.01±0.1 | 0.04±0.2 | 0.03±0.2 |
| Eating | | | | | | | | | | | | |
| Dementia | 0.6±0.9 | 0.4±0.7 | 0.5±0.6 | 0.3±0.5 | 0.2±0.7 | 0.3±0.7 | 0.3±0.7 | 1.2±1.0 | 0.7±1.0 | 0.3±0.8 | 0.3±0.5 | 0.5±0.8 |
| Non-dementia | 0.01±0.1 | 0.04±0.2 | 0.03±0.2 | 0.02±0.1 | 0.02±0.2 | 0.03±0.2 | 0.02±0.2 | 0.1±0.3 | 0.01±0.1 | 0.01±0.1 | 0.1±0.2 | 0.03±0.2 |
| Grooming | | | | | | | | | | | | |
| Dementia | 0.6±0.9 | 0.4±0.7 | 0.5±0.7 | 0.4±0.8 | 0.2±0.6 | 0.3±0.6 | 0.2±0.5 | 1.1±1.0 | 0.5±0.8 | 0.2±0.6 | 0.2±0.4 | 0.4±0.8 |
| Non-dementia | 0.02±0.1 | 0.04±0.3 | 0.03±0.2 | 0.02±0.1 | 0.01±0.1 | 0.02±0.2 | 0.02±0.2 | 0.1±0.4 | 0.01±0.1 | 0.01±0.1 | 0.03±0.2 | 0.02±0.2 |
| Toileting | | | | | | | | | | | | |
| Dementia | 0.6±1.0 | 0.4±0.7 | 0.6±0.7 | 0.3±0.6 | 0.3±0.7 | 0.2±0.6 | 0.3±0.8 | 1.3±1.2 | 0.6±0.9 | 0.3±0.7 | 0.2±0.4 | 0.5±0.8 |
| Non-dementia | 0.02±0.2 | 0.03±0.2 | 0.03±0.2 | 0.02±0.1 | 0.01±0.1 | 0.02±0.2 | 0.02±0.2 | 0.1±0.4 | 0.01±0.1 | 0.01±0.2 | 0.04±0.2 | 0.03±0.2 |
| Bathing | | | | | | | | | | | | |
| Dementia | 0.6±0.9 | 0.5±0.7 | 0.6±0.7 | 0.4±0.8 | 0.2±0.5 | 0.3±0.6 | 0.3±0.7 | 1.0±1.1 | 0.5±0.8 | 0.2±0.6 | 0.3±0.5 | 0.5±0.8 |
| Non-dementia | 0.02±0.2 | 0.04±0.2 | 0.04±0.2 | 0.02±0.2 | 0.01±0.1 | 0.04±0.2 | 0.02±0.2 | 0.1±0.4 | 0.02±0.2 | 0.01±0.1 | 0.1±0.2 | 0.03±0.2 |
| Total ADL | | | | | | | | | | | | |
| Dementia | 3.1±4.1 | 2.1±3.2 | 2.8±2.9 | 1.8±3.0 | 1.1±2.6 | 1.4±2.5 | 1.5±2.7 | 5.5±4.5 | 2.8±3.9 | 1.2±3.1 | 1.2±2.0 | 2.3±3.5 |
| Non-dementia | 0.1±0.6 | 0.2±1.0 | 0.1±0.8 | 0.1±0.6 | 0.1±0.5 | 0.1±0.8 | 0.1±0.7 | 0.4±1.6 | 0.1±0.5 | 0.05±0.5 | 0.2±0.9 | 0.1±0.8 |
| **IADL** | | | | | | | | | | | | |
| Using transport | | | | | | | | | | | | |
| Dementia | 0.1±0.4 | 0.1±0.4 | 0.5±0.6 | 0.1±0.4 | 0.3±0.8 | 0.6±1.0 | 0.2±0.6 | 0.2±0.5 | 0.1±0.3 | 0.2±0.6 | 0.04±0.2 | 0.2±0.6 |
| Non-dementia | 0.01±0.1 | 0.02±0.2 | 0.03±0.2 | 0.02±0.1 | 0.05±0.3 | 0.1±0.3 | 0.04±0.3 | 0.01±0.2 | 0.003±0.1 | 0.01±0.2 | 0.01±0.1 | 0.02±0.2 |
| Communication | | | | | | | | | | | | |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Dementia | 1.6±3.2 | 1.0±3.4 | 1.1±2.8 | 0.5±1.8 | 1.1±3.0 | 1.1±2.6 | 0.2±0.8 | 2.3±4.7 | 1.1±2.9 | 0.3±0.7 | 0.3±0.6 | 1.1±3.0 |
| Non-dementia | 0.04±0.8 | 0.02±0.2 | 0.03±0.3 | 0.1±0.7 | 0.1±0.6 | 0.1±0.6 | 0.03±0.4 | 0.1±0.7 | 0.02±0.3 | 0.002±0.05 | 0.1±0.3 | 0.04±0.5 |
| Total IADL | | | | | | | | | | | | |
| Dementia | 1.7±3.2 | 1.1±3.4 | 1.5±3.1 | 0.7±1.8 | 1.4±3.2 | 1.7±3.2 | 0.4±1.1 | 2.5±4.7 | 1.2±2.9 | 0.5±1.2 | 0.4±0.6 | 1.3±3.1 |
| Non-dementia | 0.05±0.8 | 0.03±0.3 | 0.1±0.4 | 0.1±0.7 | 0.1±0.7 | 0.1±0.7 | 0.1±0.5 | 0.1±0.7 | 0.03±0.3 | 0.02±0.2 | 0.1±0.3 | 0.1±0.6 |
| **Supervision** | | | | | | | | | | | | |
| Dementia | 1.2±3.5 | 0.8±2.8 | 1.7±3.9 | 0.5±1.3 | 2.6±5.1 | 1.5±4.5 | 1.1±4.5 | 0.8±2.5 | 0.1±0.4 | 0.7±2.2 | 0.2±0.9 | 1.1±3.5 |
| Non-dementia | 0.02±0.6 | 0.01±0.2 | 0.1±0.5 | 0.1±1.2 | 0.1±1.0 | 0.1±1.1 | 0.1±1.3 | 0.04±0.8 | 0.01±0.1 | 0.1±1.1 | 0.02±0.3 | 0.1±0.8 |
| **Total informal care** | | | | | | | | | | | | |
| Dementia | 5.9±7.5 | 3.7±6.2 | 5.8±6.8 | 3.0±5.4 | 4.7±7.0 | 4.3±6.2 | 2.6±5.3 | 8.5±6.9 | 4.1±6.1 | 2.4±5.8 | 1.8±3.0 | 4.5±6.6 |
| Non-dementia | 0.2±1.3 | 0.2±1.2 | 0.3±1.5 | 0.2±1.8 | 0.3±1.7 | 0.3±1.8 | 0.3±1.8 | 0.5±2.2 | 0.1±0.8 | 0.1±1.2 | 0.3±1.4 | 0.2±1.5 |

**Table A1.3 Hours of receiving paid home care per week, by site and dementia status**

| Services type by dementia status | Cuba | Dominican Republic | Peru (urban) | Peru (rural) | Venezuela | Mexico (urban) | Mexico (rural) | China (urban) | China (rural) | India (urban) | India (rural) | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| During the day | | | | | | | | | | | | |
| Dementia | 3.7±12.9 | 4.8±15.3 | 11.4±22.0 | 1.6±9.3 | 3.3±11.6 | 0.7±5.9 | 0.6±6.0 | 24.5±27.4 | 0 | 0 | 0 | 4.7±15.0 |
| Non-dementia | 0.1±2.3 | 0.4±4.6 | 0.6±5.7 | 0.1±2.5 | 0.3±3.7 | 0.1±2.6 | 0 | 2.2±10.8 | 0.1±1.8 | 0 | 0 | 0.4±4.4 |
| During the night | | | | | | | | | | | | |
| Dementia | 1.0±7.6 | 4.2±14.7 | 8.6±20.3 | 1.6±9.3 | 1.2±8.0 | 0.6±5.8 | 0 | 24.7±28.0 | 0 | 0 | 0 | 3.5±13.5 |
| Non-dementia | 0.1±2.2 | 0.3±4.2 | 0.3±4.2 | 0.1±2.5 | 0.2±3.5 | 0.1±1.9 | 0 | 2.3±11.1 | 0 | 0 | 0 | 0.3±4.1 |
| Total paid home care | | | | | | | | | | | | |
| Dementia | 4.7±17.5 | 8.9±29.5 | 20.0±40.6 | 3.1±18.7 | 4.4±16.9 | 1.3±11.6 | 0.6±6.0 | 49.1±54.9 | 0 | 0 | 0 | 8.2±27.4 |
| Non-dementia | 0.2±4.2 | 0.7±8.4 | 1.0±9.1 | 0.2±4.9 | 0.5±6.6 | 0.2±4.1 | 0 | 4.5±21.9 | 0.1±1.8 | 0 | 0 | 0.7±8.2 |

**Table A2.1. Variables in Services**

| Services | Cost for services | Cost for transportation | Time spent in services | Time spent for transportation | Visit times in past 3 months | Number of accompanied carers |
|---|---|---|---|---|---|---|
| Primary health centre | PPCCOST | PPCTRCST | PPCMINS | PPCTRMIN | PPCVIS | PPCCARE |
| Hospital doctor | PHPCOST | PHPTRCST | PHPMINS | PHPTRMIN | PHPVIS | PHPCARE |
| Other government health worker | POTCOST | POTTRCST | POTMINS | POTTRMIN | POTVIS | POTCARE |
| Private doctor | PPDCOST | PPDTRCST | PPDMINS | PPDTRMIN | PPDVIS | PPDCARE |
| Dentist | PDENCOST | PDENTRCT | PDENMINS | PDENTRMIN | PDENVIS | PDENCARE |
| Traditional healer | PTHCOST | PTHTRCST | PTHMINS | PTHTRMIN | PTHVIS | PTHCARE |

**Table A2.2. Variables in hospital admission and medication**

| Services | Used or not | Cost | Bed days |
|---|---|---|---|
| Hospital admission | PHOSAD | PHOSCOST | PHOSDAY |
| Medicine | PMEDS | PMEDCOST | |

**Table A2.3. Variables in social care**

| Activities | Time spent for the activity in one day (hours) | Time spent for the activity in a year (hours) |
|---|---|---|
| Dressing | ICADRE | ICADREY |
| Eating | ICAEAT | ICAEATY |
| Grooming | ICAGRO | ICAGROY |
| Toilet | ICATOI | ICATOIY |
| Bath | ICABAT | ICABATY |
| Transportation | ICIATRA | ICIATRAY |
| Communication | ICIACOM | ICIACOMY |
| Supervision | ICSUOVI | ICSUOVIY |
| Day paid home carer | DYPAID | DYPAIDY |
| Night paid home carer | NTPAID | NTPAIDY |

**Table A3.1. Linear regression model of cost of dementia and other chronic diseases in Cuba**

| Variables | Cost of medical care | | Cost of social care | | Cost of informal care | | Cost of paid home care | | Total cost | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Observed coefficients | Bootstrapped 95% confidence interval | Observed coefficients | Bootstrapped 95% confidence interval | Observed coefficients | Bootstrapped 95% confidence interval | Observed coefficients | Bootstrapped 95% confidence interval | Observed coefficients | Bootstrapped 95% confidence interval |
| Male | 21 | -33 to 103 | -62 | -247 to 144 | -65 | -237 to 122 | 3 | -29 to 39 | -41 | -233 to 172 |
| Age | -2.5 | -8.3 to 1.3 | 27* | 11 to 41 | 24* | 9.6 to 38 | 2.4 | -0.6 to 5.7 | 24* | 7.7 to 40 |
| Education level of participants | | | | | | | | | | |
| No education | Reference | | Reference | | Reference | | Reference | | Reference | |
| Less than primary | -101* | -244 to -3.8 | -439 | -1340 to 366 | -315 | -1090 to 404 | -124 | -335 to 43 | -540 | -1440 to 291 |
| Completed primary | -103 | -252 to 6.5 | -380 | -1289 to 447 | -249 | -1035 to 503 | -131 | -339 to 31 | -483 | -1384 to 364 |
| Completed secondary or higher | -69 | -215 to 29 | -323 | -1201 to 474 | -215 | -998 to 490 | -108 | -314 to 50 | -392 | -1296 to 402 |
| Marital status of participants | | | | | | | | | | |
| Single | Reference | | Reference | | Reference | | Reference | | Reference | |
| Married | 49* | 10 to 94 | 224 | -130 to 549 | 268 | -61 to 567 | -44 | -115 to 17 | 272 | -78 to 599 |
| Divorced/widowed | 11 | -20 to 45 | 142 | -173 to 435 | 169 | -121 to 423 | -27 | -109 to 36 | 152 | -167 to 444 |
| Living arrangement of participants | | | | | | | | | | |
| Living alone | Reference | | Reference | | Reference | | Reference | | Reference | |
| Living with spouse | -72* | -152 to -6.6 | 342* | 42 to 621 | 361* | 114 to 611 | -19 | -118 to 52 | 271 | -11 to 553 |
| Living with children | -38 | -95 to 12 | 45 | -268 to 323 | 94 | -154 to 341 | -49 | -155 to 27 | 6.9 | -288 to 295 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Living with other relatives | -105* | -260 to -2.2 | 104 | -220 to 442 | 137 | -135 to 423 | -33 | -141 to 50 | -1.8 | -354 to 366 |
| Living with children under 16 | 60 | -25 to 203 | 218* | 23 to 406 | 209* | 25 to 395 | 8.3 | -23 to 39 | 278* | 58 to 527 |
| Participants with any income | 8.5 | -33 to 45 | -224 | -525 to 69 | -206 | -491 to 65 | -18 | -74 to 28 | -216 | -532 to 77 |
| Number of assets in the family | 21 | -5.8 to 65 | 21 | -62 to 114 | -4.5 | -84 to 80 | 26* | 10 to 43 | 43 | -49 to 141 |
| Participant has private insurance | -188 | -469 to 0 | 58 | -181 to 283 | 34 | -205 to 255 | 24 | -31 to 87 | -131 | -495 to 184 |
| Male carers | -22 | -73 to 18 | -91 | -245 to 82 | -81 | -220 to 86 | -10 | -41 to 24 | -113 | -277 to 63 |
| Age of carers | 1.4 | -0.3 to 3.8 | 6.1* | 0.09 to 13 | 5.4 | -0.4 to 12 | 0.8 | -0.3 to 2 | 7.5* | 1.1 to 14 |
| Education level of carers | | | | | | | | | | |
| Less than primary | Reference | | Reference | | Reference | | Reference | | Reference | |
| Completed primary | 20 | -34 to 69 | 182 | -158 to 498 | 196 | -128 to 496 | -14 | -61 to 26 | 202 | -164 to 528 |
| Completed secondary | 92 | -19 to 261 | -17 | -338 to 298 | -1.4 | -303 to 306 | -16 | -65 to 27 | 75 | -292 to 431 |
| Completed tertiary | 69 | -15 to 177 | 189 | -174 to 539 | 189 | -152 to 522 | -0.6 | -58 to 55 | 258 | -124 to 612 |
| Marital status of carers | | | | | | | | | | |
| Single | Reference | | Reference | | Reference | | Reference | | Reference | |
| Married | -32 | -114 to 32 | -27 | -403 to 352 | 15 | -367 to 384 | -43 | -192 to 41 | -59 | -441 to 327 |
| Divorced/widowed | -56 | -146 to 16 | 29 | -400 to 426 | 83 | -340 to 461 | -54 | -213 to 38 | -27 | -461 to 386 |
| Carers with paid work | -14 | -62 to 26 | -13 | -222 to 163 | -66 | -263 to 105 | 53* | 18 to 91 | -27 | -234 to 160 |
| Carers' relationship to participants | | | | | | | | | | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Spouse | Reference | | Reference | | Reference | | Reference | | Reference | |
| Children | -16 | -102 to 47 | 235 | -31 to 519 | 238 | -12 to 508 | -3.4 | -56 to 52 | 219 | -63 to 506 |
| Children in law or other relatives | -7.9 | -63 to 37 | 101 | -169 to 393 | 113 | -141 to 390 | -12 | -54 to 29 | 94 | -181 to 391 |
| Non-relative | -20 | -83 to 33 | 122 | -239 to 540 | 122 | -201 to 509 | -0.2 | -83 to 73 | 102 | -262 to 518 |
| Dementia | -5.5 | -40 to 33 | 3856* | 3237 to 4500 | 3658* | 3065 to 4243 | 198* | 99 to 311 | 3851* | 3242 to 4496 |
| Depression | 91* | 22 to 178 | 448 | -96 to 1004 | 406 | -107 to 925 | 43 | -38 to 141 | 540 | -32 to 1121 |
| Hypertension | 32 | -24 to 120 | -177* | -369 to -9.3 | -179* | -356 to -22 | 2 | -28 to 29 | -145 | -362 to 56 |
| Diabetes | -1.9 | -63 to 44 | 1.2 | -207 to 223 | 7.1 | -192 to 204 | -5.9 | -38 to 30 | -0.7 | -217 to 218 |
| Ischemic heart disease | 11 | -40 to 58 | -265* | -460 to -72 | -231* | -421 to -53 | -33* | -64 to -1.6 | -253* | -455 to -67 |
| Stroke | 4.5 | -55 to 55 | 973* | 478 to 1465 | 853* | 412 to 1299 | 120* | 24 to 239 | 977* | 481 to 1481 |
| COPD | -49 | -134 to 18 | -144 | -528 to 300 | -176 | -528 to 206 | 32 | -41 to 119 | -193 | -594 to 233 |
| Number of physical impairment | 16* | 3.8 to 27 | 139* | 51 to 215 | 124* | 40 to 192 | 15* | 1.1 to 31 | 156* | 68 to 232 |
| Constant | 155 | -83 to 417 | -2157* | -3901 to -460 | -2024* | -3635 to -461 | -133 | -430 to 149 | -2002* | -3771 to -344 |
| $R^2$ | 0.09 | | 0.41 | | 0.40 | | 0.23 | | 0.42 | |
| Adjusted $R^2$ | 0.08 | | 0.40 | | 0.39 | | 0.22 | | 0.41 | |

* Significant at 95% level

** Sample in Cuba only came from urban area.

**Table A3.2. Linear regression model of cost of dementia for each level of severity in Cuba ****

| Variables | Cost of medical care | | Cost of social care | | Cost of informal care | | Cost of paid home care | | Total cost | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Observed coefficients | Bootstrapped 95% confidence interval | Observed coefficients | Bootstrapped 95% confidence interval | Observed coefficients | Bootstrapped 95% confidence interval | Observed coefficients | Bootstrapped 95% confidence interval | Observed coefficients | Bootstrapped 95% confidence interval |
| Male | 19 | -34 to 100 | 73 | -85 to 249 | 58 | -92 to 223 | 15 | -16 to 49 | 92 | -82 to 278 |
| Age | -2.9 | -9.4 to 1.1 | 10 | -2.7 to 22 | 9.7 | -1.8 to 21 | 0.6 | -2.2 to 3.4 | 7.4 | -5.8 to 21 |
| Education level of participants | | | | | | | | | | |
| No education | Reference | | Reference | | Reference | | Reference | | Reference | |
| Less than primary | -100* | -246 to -1.9 | -377 | -888 to 78 | -264 | -692 to 146 | -113 | -298 to 36 | -477* | -991 to -11 |
| Completed primary | -97 | -246 to 11 | -260 | -795 to 186 | -141 | -594 to 249 | -119 | -300 to 23 | -357 | -902 to 112 |
| Completed secondary or higher | -60 | -207 to 40 | -337 | -832 to 109 | -231 | -653 to 152 | -106 | -284 to 35 | -397 | -919 to 64 |
| Marital status of participants | | | | | | | | | | |
| Single | Reference | | Reference | | Reference | | Reference | | Reference | |
| Married | 51* | 11 to 98 | 177 | -115 to 439 | 225 | -48 to 465 | -48 | -115 to 11 | 228 | -67 to 491 |
| Divorced/widowed | 10 | -22 to 43 | 145 | -114 to 385 | 173 | -55 to 388 | -28 | -99 to 32 | 155 | -105 to 405 |
| Living arrangement of participants | | | | | | | | | | |
| Living alone | Reference | | Reference | | Reference | | Reference | | Reference | |
| Living with spouse | -72* | -156 to -5.4 | 382* | 144 to 625 | 401* | 209 to 617 | -19 | -110 to 45 | 310* | 54 to 559 |
| Living with children | -37 | -91 to 13 | 37 | -206 to 283 | 87 | -129 to 290 | -50 | -148 to 23 | -0.3 | -252 to 244 |
| Living with other relatives | -104* | -256 to -1.9 | 51 | -226 to 349 | 90 | -166 to 361 | -39 | -140 to 38 | -53 | -391 to 273 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Living with children under 16 | 58 | -25 to 200 | 161 | -4.7 to 318 | 152* | 2.6 to 300 | 8.7 | -22 to 39 | 219* | 22 to 438 |
| Participants with any income | 4.6 | -36 to 42 | 31 | -234 to 271 | 35 | -213 to 271 | -3.9 | -55 to 42 | 35 | -236 to 288 |
| Number of assets in the family | 20 | -6 to 61 | 5.9 | -56 to 76 | -19 | -78 to 43 | 25* | 9.9 to 41 | 26 | -45 to 107 |
| Participant has private insurance | -184 | -476 to 0.8 | 32 | -222 to 260 | 14 | -264 to 261 | 18 | -34 to 74 | -152 | -567 to 164 |
| Male carers | -21 | -70 to 19 | -29 | -155 to 110 | -24 | -152 to 113 | -5.2 | -33 to 26 | -49 | -189 to 95 |
| Age of carers | 1.3 | -0.3 to 3.7 | 4.1 | -1.3 to 9.6 | 3.4 | -1.6 to 8.8 | 0.7 | -0.4 to 1.8 | 5.4 | -0.6 to 11 |
| Education level of carers | | | | | | | | | | |
| Less than primary | Reference | | Reference | | Reference | | Reference | | Reference | |
| Completed primary | 23 | -32 to 73 | 137 | -166 to 391 | 153 | -125 to 396 | -16 | -61 to 23 | 160 | -157 to 429 |
| Completed secondary | 94 | -18 to 263 | -28 | -301 to 234 | -10 | -271 to 242 | -18 | -63 to 23 | 66 | -257 to 388 |
| Completed tertiary | 72 | -14 to 185 | 145 | -150 to 444 | 147 | -133 to 432 | -2.2 | -53 to 48 | 217 | -99 to 535 |
| Marital status of carers | | | | | | | | | | |
| Single | Reference | | Reference | | Reference | | Reference | | Reference | |
| Married | -34 | -117 to 30 | -12 | -322 to 309 | 24 | -311 to 340 | -36 | -168 to 45 | -45 | -370 to 285 |
| Divorced/widowed | -61 | -161 to 16 | 75 | -265 to 420 | 119 | -244 to 466 | -45 | -184 to 45 | 13 | -358 to 380 |
| Carers with paid work | -15 | -64 to 26 | 23 | -147 to 182 | -29 | -190 to 117 | 52* | 17 to 88 | 7.7 | -166 to 166 |
| Carers' relationship to participants | | | | | | | | | | |
| Spouse | Reference | | Reference | | Reference | | Reference | | Reference | |
| Children | -14 | -96 to 48 | 132 | -55 to 382 | 137 | -43 to 365 | -5.6 | -58 to 50 | 117 | -93 to 376 |
| Children in law or other relatives | -5.6 | -59 to 38 | 125 | -111 to 381 | 130 | -88 to 387 | -5.4 | -46 to 38 | 119 | -132 to 376 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Non-relative | -13 | -70 to 36 | 108 | -206 to 495 | 107 | -180 to 464 | 0.8 | -73 to 73 | 95 | -222 to 478 |
| Depression | 78* | 4.4 to 169 | 544* | 125 to 1032 | 498* | 115 to 938 | 46 | -28 to 137 | 622* | 190 to 1121 |
| Hypertension | 33 | -24 to 124 | -34 | -172 to 120 | -41 | -179 to 103 | 7.8 | -21 to 34 | -0.7 | -165 to 171 |
| Diabetes | -2.4 | -64 to 44 | 19 | -139 to 183 | 23 | -124 to 174 | -3.9 | -35 to 30 | 16 | -150 to 188 |
| Ischemic heart disease | 14 | -34 to 57 | -127 | -297 to 27 | -99 | -255 to 49 | -28 | -55 to 1.1 | -113 | -286 to 47 |
| Stroke | 0.3 | -64 to 54 | 683* | 254 to 1100 | 580* | 178 to 965 | 103* | 10 to 217 | 683* | 257 to 1101 |
| COPD | -49 | -133 to 18 | -15 | -323 to 315 | -52 | -317 to 231 | 37 | -31 to 119 | -64 | -380 to 285 |
| Number of physical impairment | 15 | -0.9 to 27 | 125* | 53 to 192 | 110* | 39 to 172 | 15* | 1.2 to 31 | 140* | 64 to 208 |
| Severity of dementia | | | | | | | | | | |
| No dementia | Reference | | Reference | | Reference | | Reference | | Reference | |
| Questionable | 73 | -3.3 to 209 | 52 | -39 to 150 | 60 | -27 to 153 | -8.4 | -25 to 5.7 | 125 | -3.8 to 288 |
| Mild | 39 | -25 to 123 | 2007* | 1396 to 2683 | 1915* | 1338 to 2564 | 92* | 8.5 to 190 | 2046* | 1430 to 2714 |
| Moderate | 38 | -62 to 172 | 7396* | 6183 to 8691 | 6714* | 5562 to 7958 | 682* | 350 to 1057 | 7434* | 6214 to 8768 |
| Severe | 18 | -63 to 125 | 9390* | 7895 to 11031 | 9118* | 7709 to 10649 | 272* | 19 to 607 | 9409* | 7906 to 11039 |
| Constant | 166 | -74 to 435 | -1349 | -2796 to 57 | -1308* | -2602 to -47 | -41 | -342 to 245 | -1183 | -2700 to 239 |
| $R^2$ | 0.11 | | 0.49 | | 0.48 | | 0.27 | | 0.50 | |
| Adjusted $R^2$ | 0.09 | | 0.48 | | 0.47 | | 0.25 | | 0.49 | |

* Significant at 95% level

** Sample in Cuba only came from urban area.

**Table A3.3 Linear regression model of cost of dementia and other chronic diseases in the Dominican Republic ****

| Variables | Cost of medical care | | Cost of social care | | Cost of informal care | | Cost of paid home care | | Total cost | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Observed coefficients | Bootstrapped 95% confidence interval | Observed coefficients | Bootstrapped 95% confidence interval | Observed coefficients | Bootstrapped 95% confidence interval | Observed coefficients | Bootstrapped 95% confidence interval | Observed coefficients | Bootstrapped 95% confidence interval |
| Male | 59* | 1.3 to 119 | -5.9 | -382 to 378 | 25 | -322 to 396 | -31 | -121 to 54 | 53 | -314 to 448 |
| Age | -2.6 | -6.1 to 0.6 | 63* | 34 to 93 | 53* | 26 to 81 | 10* | 2.9 to 18 | 61* | 31 to 90 |
| Education level of participants | | | | | | | | | | |
| No education | Reference | | Reference | | Reference | | Reference | | Reference | |
| Less than primary | 8.9 | -50 to 65 | 325 | -104 to 753 | 294 | -80 to 681 | 31 | -100 to 141 | 334 | -108 to 767 |
| Completed primary | 56 | -21 to 138 | 246 | -309 to 780 | 240 | -236 to 704 | 6.2 | -142 to 166 | 303 | -243 to 829 |
| Completed secondary or higher | 19 | -63 to 109 | 176 | -345 to 648 | 205 | -264 to 653 | -29 | -175 to 104 | 195 | -320 to 679 |
| Marital status of participants | | | | | | | | | | |
| Single | Reference | | Reference | | Reference | | Reference | | Reference | |
| Married | -26 | -109 to 48 | -365 | -1384 to 363 | -432 | -1303 to 213 | 67 | -140 to 244 | -391 | -1405 to 336 |
| Divorced/widowed | 34 | -59 to 119 | 192 | -623 to 877 | 112 | -629 to 749 | 81 | -75 to 208 | 227 | -588 to 918 |
| Living arrangement of participants | | | | | | | | | | |
| Living alone | Reference | | Reference | | Reference | | Reference | | Reference | |
| Living with pouse | 11 | -110 to 124 | 440* | 74 to 844 | 316* | 0.9 to 654 | 124 | -4.9 to 266 | 451* | 55 to 883 |
| Living with children | -34 | -151 to 67 | 800* | 369 to 1237 | 658* | 272 to 1036 | 143* | 2.8 to 295 | 767* | 319 to 1262 |
| Living with other relatives | -21 | -179 to 112 | 909* | 203 to 1697 | 636* | 51 to 1270 | 273* | 45 to 539 | 888* | 118 to 1679 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Living with children under 16 | -3.4 | -55 to 49 | -16 | -401 to 434 | 59 | -294 to 471 | -75 | -178 to 32 | -19 | -430 to 450 |
| Participants with any income | 12 | -49 to 65 | -12 | -331 to 346 | -125 | -417 to 199 | 113* | 31 to 196 | -0.5 | -333 to 359 |
| Number of assets in the family | -23* | -46 to -0.2 | -1.7 | -122 to 112 | -46 | -162 to 59 | 44* | 14 to 81 | -25 | -146 to 93 |
| Participant has private insurance | 59 | -19 to 159 | -85 | -409 to 249 | -20 | -323 to 280 | -66 | -146 to 27 | -27 | -369 to 335 |
| Male carers | 46 | -32 to 135 | -6.7 | -271 to 250 | -2.9 | -237 to 240 | -3.8 | -101 to 102 | 39 | -246 to 329 |
| Age of carers | -1.4 | -3.6 to 0.7 | -11 | -24 to 1.4 | -11* | -23 to -0.6 | 0.4 | -3.4 to 3.8 | -13 | -25 to 0.2 |
| Education level of carers | | | | | | | | | | |
| Less than primary | Reference | | Reference | | Reference | | Reference | | Reference | |
| Completed primary | -38 | -100 to 18 | 493* | 54 to 997 | 463* | 58 to 900 | 30 | -92 to 167 | 456* | 5.4 to 954 |
| Completed secondary | -14 | -90 to 59 | 418 | -38 to 883 | 425* | 25 to 853 | -6.6 | -130 to 136 | 404 | -52 to 890 |
| Completed tertiary | -38 | -108 to 25 | 897* | 222 to 1698 | 984* | 332 to 1741 | -87 | -236 to 55 | 859* | 154 to 1670 |
| Marital status of carers | | | | | | | | | | |
| Single | Reference | | Reference | | Reference | | Reference | | Reference | |
| Married | 132 | -77 to 241 | 228 | -556 to 821 | 206 | -504 to 743 | 22 | -144 to 178 | 360 | -583 to 952 |
| Divorced/widowed | 164 | 0 to 297 | 537 | -83 to 1261 | 475 | -81 to 1086 | 62 | -117 to 250 | 700 | 0 to 1391 |
| Carers with paid work | -23 | -88 to 38 | -136 | -511 to 246 | -291 | -604 to 28 | 155* | 33 to 285 | -159 | -538 to 231 |
| Carers' relationship to participants | | | | | | | | | | |
| Spouse | Reference | | Reference | | Reference | | Reference | | Reference | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Children | -23 | -115 to 64 | -1448* | -2198 to -658 | -1410* | -2117 to -674 | -39 | -211 to 146 | -1472* | -2206 to -671 |
| Children in law or other relatives | -60 | -138 to 18 | -833* | -1559 to -106 | -882* | -1565 to -207 | 49 | -153 to 263 | -893* | -1627 to -143 |
| Non-relative | -49 | -181 to 59 | -766* | -1523 to -28 | -897* | -1547 to -242 | 132 | -80 to 354 | -815* | -1546 to -68 |
| Dementia | -44 | -100 to 18 | 3847* | 2813 to 4994 | 3433* | 2468 to 4506 | 415* | 150 to 676 | 3804* | 2773 to 4956 |
| Depression | 21 | -71 to 114 | 177 | -436 to 822 | 138 | -399 to 705 | 39 | -136 to 234 | 197 | -401 to 868 |
| Hypertension | -35 | -105 to 24 | -5.3 | -362 to 366 | -32 | -363 to 286 | 27 | -67 to 116 | -40 | -392 to 326 |
| Diabetes | 58 | -15 to 139 | -38 | -400 to 329 | -65 | -370 to 248 | 27 | -109 to 171 | 20 | -340 to 398 |
| Ischemic heart disease | -19 | -112 to 74 | 397 | -753 to 1831 | 520 | -633 to 1984 | -123* | -240 to -25 | 378 | -760 to 1849 |
| Stroke | 94* | 2.6 to 199 | 1311* | 519 to 2204 | 1080* | 341 to 1897 | 231 | -17 to 514 | 1405* | 610 to 2314 |
| COPD | 43 | -100 to 244 | -561* | -1082 to -59 | -449* | -930 to -3 | -112 | -267 to 87 | -518 | -1047 to 32 |
| Number of physical impairment | 46* | 29 to 66 | 151* | 21 to 291 | 117* | 4.5 to 239 | 34 | -12 to 79 | 196* | 61 to 337 |
| Constant | 233 | -53 to 702 | -4742* | -6816 to -2387 | -3433* | -5292 to -1386 | -1309* | -2081 to -591 | -4509* | -6609 to -2028 |
| $R^2$ | 0.05 | | 0.23 | | 0.22 | | 0.08 | | 0.22 | |
| Adjusted $R^2$ | 0.03 | | 0.21 | | 0.21 | | 0.06 | | 0.21 | |

* Significant at 95% level

** Sample in Dominican Republic only came from urban area.

**Table A3.4. Linear regression model of cost of dementia in each level of severity in the Dominican Republic ****

| Variables | Cost of medical care | | Cost of social care | | Cost of informal care | | Cost of paid home care | | Total cost | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Observed coefficients | Bootstrapped 95% confidence interval | Observed coefficients | Bootstrapped 95% confidence interval | Observed coefficients | Bootstrapped 95% confidence interval | Observed coefficients | Bootstrapped 95% confidence interval | Observed coefficients | Bootstrapped 95% confidence interval |
| Male | 63* | 4.2 to 122 | -92 | -419 to 267 | -48 | -362 to 275 | -45 | -131 to 42 | -30 | -358 to 337 |
| Age | -2.4 | -5.6 to 0.6 | 52* | 28 to 75 | 44* | 21 to 66 | 7.9* | 1.4 to 15 | 49* | 26 to 73 |
| Education level of participants | | | | | | | | | | |
| No education | Reference | | Reference | | Reference | | Reference | | Reference | |
| Less than primary | 8.7 | -49 to 64 | 230 | -115 to 585 | 208 | -115 to 519 | 22 | -98 to 133 | 239 | -128 to 592 |
| Completed primary | 52 | -24 to 134 | 389 | -86 to 862 | 363 | -41 to 774 | 25 | -123 to 169 | 441 | -55 to 904 |
| Completed secondary or higher | 17 | -67 to 111 | 36 | -438 to 503 | 78 | -365 to 482 | -43 | -192 to 95 | 53 | -424 to 519 |
| Marital status of participants | | | | | | | | | | |
| Single | Reference | | Reference | | Reference | | Reference | | Reference | |
| Married | -27 | -111 to 47 | -284 | -902 to 269 | -366 | -886 to 109 | 82 | -84 to 245 | -311 | -913 to 242 |
| Divorced/widowed | 36 | -58 to 121 | 127 | -421 to 650 | 50 | -471 to 527 | 77 | -43 to 198 | 163 | -404 to 699 |
| Living arrangement of participants | | | | | | | | | | |
| Living alone | Reference | | Reference | | Reference | | Reference | | Reference | |
| Living with spouse | 11 | -110 to 124 | 470* | 130 to 808 | 344* | 36 to 626 | 126 | -6.1 to 253 | 481* | 119 to 843 |
| Living with children | -31 | -148 to 69 | 718* | 303 to 1101 | 590* | 232 to 947 | 128 | -9.1 to 269 | 687* | 260 to 1097 |
| Living with other relatives | -19 | -171 to 114 | 610* | 24 to 1251 | 375 | -152 to 903 | 235* | 24 to 475 | 590* | 0.8 to 1232 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Living with children under 16 | -2.4 | -55 to 51 | -150 | -480 to 200 | -62 | -360 to 264 | -88 | -193 to 14 | -152 | -491 to 198 |
| Participants with any income | 9.4 | -51 to 63 | -99 | -394 to 192 | -209 | -478 to 57 | 110* | 24 to 191 | -90 | -399 to 212 |
| Number of assets in the family | -22 | -46 to 0.8 | -21 | -133 to 81 | -64 | -171 to 32 | 43* | 13 to 76 | -44 | -159 to 63 |
| Participant has private insurance | 58 | -19 to 156 | -136 | -425 to 162 | -68 | -351 to 227 | -69 | -147 to 17 | -78 | -389 to 257 |
| Male carers | 49 | -31 to 139 | -229 | -477 to 24 | -201 | -414 to 26 | -28 | -122 to 70 | -180 | -437 to 87 |
| Age of carers | -1.4 | -3.6 to 0.7 | -6.6 | -18 to 4.5 | -7.4 | -17 to 2.6 | 0.8 | -3 to 4.2 | -8 | -20 to 3.4 |
| Education level of carers | | | | | | | | | | |
| Less than primary | Reference | | Reference | | Reference | | Reference | | Reference | |
| Completed primary | -35 | -96 to 20 | 218 | -140 to 599 | 221 | -105 to 574 | -3 | -120 to 119 | 183 | -173 to 572 |
| Completed secondary | -8 | -85 to 68 | -63 | -396 to 290 | 2.3 | -304 to 335 | -65 | -188 to 73 | -71 | -420 to 300 |
| Completed tertiary | -33 | -103 to 29 | 581 | -15 to 1274 | 708* | 138 to 1353 | -127 | -269 to 14 | 548 | -65 to 1247 |
| Marital status of carers | | | | | | | | | | |
| Single | Reference | | Reference | | Reference | | Reference | | Reference | |
| Married | 136 | -76 to 253 | -46 | -515 to 476 | -38 | -465 to 423 | -8.7 | -159 to 149 | 90 | -420 to 602 |
| Divorced/widowed | 169 | 0 to 315 | 54 | -466 to 647 | 47 | -438 to 571 | 7.1 | -154 to 193 | 223 | -304 to 817 |
| Carers with paid work | -22 | -88 to 38 | -85 | -405 to 230 | -244 | -507 to 26 | 159* | 33 to 276 | -107 | -429 to 213 |
| Carers' relationship to participants | | | | | | | | | | |
| Spouse | Reference | | Reference | | Reference | | Reference | | Reference | |
| Children | -28 | -121 to 60 | -703* | -1276 to -92 | -746* | -1291 to -185 | 42 | -130 to 219 | -731* | -1341 to -111 |
| Children in law or other relatives | -62 | -141 to 17 | -439 | -1085 to 177 | -533 | -1086 to 40 | 93 | -102 to 298 | -501 | -1161 to 112 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Non-relative | -51 | -186 to 57 | -503 | -1113 to 97 | -665* | -1194 to -146 | 162 | -46 to 367 | -554 | -1220 to 69 |
| Depression | 30 | -65 to 127 | 293 | -238 to 870 | 256 | -223 to 752 | 37 | -122 to 216 | 323 | -195 to 912 |
| Hypertension | -38 | -108 to 23 | 121 | -202 to 444 | 74 | -231 to 355 | 47 | -44 to 135 | 83 | -246 to 395 |
| Diabetes | 58 | -15 to 138 | 92 | -195 to 417 | 48 | -221 to 332 | 44 | -87 to 183 | 150 | -161 to 476 |
| Ischemic heart disease | -21 | -116 to 72 | 579 | -382 to 1745 | 674 | -316 to 1897 | -96 | -217 to 9.6 | 558 | -396 to 1714 |
| Stroke | 100* | 14 to 203 | 1117* | 392 to 1822 | 926* | 335 to 1578 | 191 | -58 to 458 | 1217* | 521 to 1935 |
| COPD | 40 | -104 to 240 | -91 | -598 to 369 | -34 | -496 to 357 | -57 | -203 to 150 | -51 | -582 to 453 |
| Number of physical impairment | 47* | 29 to 69 | -8.1 | -120 to 113 | -24 | -123 to 79 | 16 | -23 to 56 | 39 | -73 to 160 |
| Severity of dementia | | | | | | | | | | |
| No dementia | Reference | | Reference | | Reference | | Reference | | Reference | |
| Questionable | -5 | -56 to 48 | 97 | -92 to 272 | 84 | -76 to 248 | 13 | -57 to 76 | 92 | -95 to 284 |
| Mild | -69* | -141 to -3.2 | 1738* | 1035 to 2498 | 1436* | 854 to 2087 | 302* | 42 to 567 | 1669* | 988 to 2442 |
| Moderate | -141* | -248 to -39 | 9924* | 6597 to 13472 | 8750* | 5509 to 12407 | 1174* | 289 to 2151 | 9783* | 6489 to 13382 |
| Severe | -48 | -198 to 125 | 16711* | 11438 to 22258 | 14777* | 9963 to 19423 | 1934* | 365 to 3917 | 16663* | 11376 to 22201 |
| Constant | 204 | -81 to 669 | -3189* | -4969 to -1363 | -2102* | -3609 to -455 | -1087* | -1810 to -440 | -2985* | -4673 to -1079 |
| $R^2$ | 0.05 | | 0.45 | | 0.44 | | 0.13 | | 0.44 | |
| Adjusted $R^2$ | 0.03 | | 0.44 | | 0.42 | | 0.11 | | 0.43 | |

* Significant at 95% level

** Sample in Dominican Republic only came from urban area.

**Table A3.5. Linear regression model of cost of dementia and other chronic diseases in Peru**

| Variables | Cost of medical care | | Cost of social care | | Cost of informal care | | Cost of paid home care | | Total cost | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Observed coefficients | Bootstrapped 95% confidence interval | Observed coefficients | Bootstrapped 95% confidence interval | Observed coefficients | Bootstrapped 95% confidence interval | Observed coefficients | Bootstrapped 95% confidence interval | Observed coefficients | Bootstrapped 95% confidence interval |
| Rural area | -177* | -318 to -70 | -164 | -789 to 449 | -162 | -736 to 425 | -1.8 | -138 to 133 | -341 | -967 to 306 |
| Male | 29 | -105 to 166 | -495 | -1065 to 114 | -295 | -831 to 243 | -200* | -352 to -47 | -466 | -1066 to 144 |
| Age | -11* | -20 to -3.8 | 69* | 24 to 112 | 53* | 15 to 92 | 15* | 4.4 to 27 | 58* | 12 to 102 |
| Education level of participants | | | | | | | | | | |
| No education | Reference | | Reference | | Reference | | Reference | | Reference | |
| Less than primary | 53 | -108 to 195 | 1718* | 484 to 3050 | 1549* | 389 to 2765 | 169 | -150 to 478 | 1771* | 509 to 3106 |
| Completed primary | -20 | -167 to 88 | 1033 | -24 to 2097 | 906 | -73 to 1827 | 127 | -178 to 377 | 1012 | -59 to 2095 |
| Completed secondary or higher | 62 | -120 to 237 | 1088 | -139 to 2356 | 924 | -194 to 2082 | 164 | -192 to 478 | 1150 | -95 to 2431 |
| Marital status of participants | | | | | | | | | | |
| Single | Reference | | Reference | | Reference | | Reference | | Reference | |
| Married | 48 | -83 to 186 | -185 | -1209 to 898 | -370 | -1309 to 584 | 185 | -76 to 454 | -137 | -1158 to 944 |
| Divorced/widowed | -28 | -140 to 77 | -275 | -1385 to 888 | -260 | -1235 to 749 | -15 | -281 to 258 | -302 | -1460 to 844 |
| Living arrangement of participants | | | | | | | | | | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Living alone | Reference | | Reference | | Reference | | Reference | | Reference | |
| Living with spouse | -26 | -133 to 80 | 1373* | 521 to 2351 | 1018* | 302 to 1845 | 354* | 144 to 598 | 1347* | 502 to 2356 |
| Living with children | 144* | 11 to 300 | 1905* | 1078 to 2785 | 1475* | 729 to 2272 | 430* | 230 to 658 | 2049* | 1227 to 2944 |
| Living with other relatives | 51 | -64 to 174 | 1949* | 938 to 2948 | 1516* | 586 to 2434 | 433* | 183 to 692 | 2001* | 993 to 3012 |
| Living with children under 16 | -120 | -296 to 8.2 | -506 | -1101 to 35 | -323 | -864 to 200 | -183* | -336 to -50 | -626* | -1225 to -58 |
| Participants with any income | 85 | -23 to 214 | 577 | -85 to 1286 | 447 | -116 to 1038 | 130 | -57 to 312 | 662 | -0.9 to 1360 |
| Number of assets in the family | -4.1 | -47 to 36 | 43 | -303 to 382 | 9.2 | -329 to 327 | 34 | -25 to 89 | 39 | -310 to 378 |
| Participant has private insurance | 110* | 26 to 198 | -170 | -959 to 596 | -244 | -946 to 419 | 75 | -116 to 257 | -60 | -848 to 700 |
| Male carers | 34 | -82 to 179 | -105 | -575 to 437 | -17 | -433 to 473 | -88 | -214 to 39 | -71 | -568 to 498 |
| Age of carers | -2.7 | -13 to 4.3 | -30* | -50 to -10 | -21* | -38 to -3.4 | -9* | -16 to -2.4 | -32* | -53 to -11 |
| Education level of carers | | | | | | | | | | |
| Less than primary | Reference | | Reference | | Reference | | Reference | | Reference | |
| Completed primary | 176* | 26 to 395 | -1165 | -2534 to 101 | -984 | -2382 to 297 | -181 | -429 to 41 | -989 | -2385 to 283 |
| Completed secondary | -5.3 | -171 to 126 | -1231 | -2569 to 150 | -999 | -2402 to 333 | -232 | -517 to 8.3 | -1236 | -2570 to 144 |
| Completed tertiary | 62 | -165 to 280 | -1057 | -2500 to 342 | -1000 | -2505 to 367 | -57 | -400 to 235 | -994 | -2481 to 391 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Marital status of carers | | | | | | | | | | |
| Single | Reference | | Reference | | Reference | | Reference | | Reference | |
| Married | 14 | -117 to 149 | -441 | -1156 to 213 | -305 | -913 to 239 | -136 | -305 to 48 | -427 | -1149 to 260 |
| Divorced/widowed | 6.7 | -154 to 185 | 61 | -1136 to 1259 | 400 | -736 to 1515 | -339* | -566 to -101 | 68 | -1161 to 1291 |
| Carers with paid work | 0.2 | -140 to 130 | 924* | 191 to 1692 | 477 | -156 to 1135 | 447* | 262 to 649 | 924* | 173 to 1728 |
| Carers' relationship to participants | | | | | | | | | | |
| Spouse | Reference | | Reference | | Reference | | Reference | | Reference | |
| Children | -94 | -386 to 115 | -1544* | -2299 to -753 | -1164* | -1799 to -489 | -379* | -593 to -181 | -1638* | -2469 to -773 |
| Children in law or other relatives | 52 | -260 to 326 | -682 | -1526 to 181 | -645 | -1381 to 63 | -37 | -286 to 220 | -631 | -1512 to 267 |
| Non-relative | -135 | -455 to 90 | 463 | -550 to 1566 | -420 | -1255 to 426 | 884* | 549 to 1263 | 328 | -707 to 1425 |
| Dementia | -42 | -130 to 43 | 10375* | 8248 to 12767 | 8870* | 6862 to 11040 | 1505* | 960 to 2094 | 10332* | 8196 to 12695 |
| Depression | 92 | -126 to 293 | 1214 | -424 to 3215 | 1301 | -298 to 3228 | -87 | -396 to 280 | 1306 | -361 to 3378 |
| Hypertension | 122* | 10 to 266 | -115 | -584 to 320 | -119 | -533 to 290 | 4 | -120 to 119 | 7 | -492 to 481 |
| Diabetes | 73 | -85 to 239 | 536 | -435 to 1562 | 411 | -482 to 1370 | 126 | -118 to 414 | 610 | -386 to 1649 |
| Ischemic heart disease | -47 | -218 to 107 | -89 | -1018 to 774 | 124 | -711 to 986 | -214 | -430 to 4.2 | -136 | -1084 to 768 |
| Stroke | 81 | -163 to 290 | 3461* | 1890 to 5214 | 3217* | 1783 to 4723 | 244 | -114 to 681 | 3542* | 1942 to 5289 |
| COPD | 266 | -49 to 625 | -720 | -1629 to 240 | -662 | -1498 to 259 | -58 | -277 to 202 | -454 | -1393 to 533 |
| Number of physical impairment | 59* | 2.1 to 153 | 292* | 42 to 535 | 285* | 62 to 510 | 7.7 | -47 to 71 | 351* | 84 to 619 |
| Constant | 816 | -116 to 2070 | -3649 | -8251 to 769 | -2757 | -6866 to 1281 | -892 | -1896 to 134 | -2834 | -7377 to 1712 |

| | | | | | |
|---|---|---|---|---|---|
| $R^2$ | 0.03 | 0.32 | 0.29 | 0.21 | 0.31 |
| Adjusted $R^2$ | 0.01 | 0.31 | 0.28 | 0.20 | 0.29 |

* Significant at 95% level

**Table A3.6. Linear regression model of cost of dementia in each level of severity in Peru**

| Variables | Cost of medical care | | Cost of social care | | Cost of informal care | | Cost of paid home care | | Total cost | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Observed coefficients | Bootstrapped 95% confidence interval | Observed coefficients | Bootstrapped 95% confidence interval | Observed coefficients | Bootstrapped 95% confidence interval | Observed coefficients | Bootstrapped 95% confidence interval | Observed coefficients | Bootstrapped 95% confidence interval |
| Rural area | -166* | -316 to -58 | -25 | -623 to 598 | -35 | -593 to 544 | 9.9 | -125 to 140 | -191 | -805 to 448 |
| Male | 32 | -96 to 170 | -476 | -1005 to 93 | -277 | -724 to 213 | -198* | -343 to -46 | -444 | -982 to 109 |
| Age | -12* | -20 to -5.2 | 73* | 33 to 112 | 57* | 22 to 92 | 16* | 4.7 to 27 | 61* | 19 to 102 |
| Education level of participants | | | | | | | | | | |
| No education | Reference | | Reference | | Reference | | Reference | | Reference | |
| Less than primary | 56 | -102 to 201 | 987 | -252 to 2208 | 928 | -155 to 2094 | 59 | -240 to 352 | 1043 | -170 to 2303 |
| Completed primary | -17 | -164 to 99 | 377 | -570 to 1407 | 350 | -554 to 1251 | 27 | -274 to 275 | 360 | -619 to 1397 |
| Completed secondary or higher | 70 | -111 to 247 | 493 | -611 to 1706 | 424 | -544 to 1462 | 69 | -272 to 383 | 563 | -613 to 1762 |
| Marital status of participants | | | | | | | | | | |
| Single | Reference | | Reference | | Reference | | Reference | | Reference | |
| Married | 47 | -86 to 185 | -264 | -1285 to 790 | -430 | -1334 to 529 | 166 | -95 to 427 | -217 | -1216 to 829 |
| Divorced/widowed | -28 | -140 to 79 | -364 | -1537 to 654 | -320 | -1396 to 634 | -44 | -327 to 208 | -391 | -1564 to 667 |
| Living arrangement of participants | | | | | | | | | | |
| Living alone | Reference | | Reference | | Reference | | Reference | | Reference | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Living with spouse | -22 | -132 to 82 | 961* | 192 to 1837 | 671* | 0.2 to 1423 | 290* | 84 to 522 | 939* | 154 to 1829 |
| Living with children | 147* | 16 to 303 | 1587* | 811 to 2403 | 1206* | 500 to 1968 | 382* | 191 to 590 | 1735* | 947 to 2573 |
| Living with other relatives | 48 | -66 to 168 | 1656* | 746 to 2538 | 1267* | 433 to 2068 | 389* | 137 to 662 | 1704* | 791 to 2596 |
| Living with children under 16 | -125 | -299 to 2.3 | -422 | -995 to 105 | -258 | -786 to 243 | -164* | -309 to -28 | -547* | -1123 to -19 |
| Participants with any income | 81 | -28 to 212 | 408 | -207 to 1020 | 307 | -237 to 821 | 101 | -63 to 265 | 489 | -132 to 1108 |
| Number of assets in the family | -3.4 | -46 to 37 | -54 | -365 to 238 | -73 | -380 to 208 | 19 | -32 to 66 | -57 | -382 to 240 |
| Participant has private insurance | 112* | 28 to 205 | -217 | -941 to 449 | -294 | -951 to 329 | 77 | -88 to 242 | -105 | -843 to 581 |
| Male carers | 36 | -86 to 181 | -313 | -768 to 144 | -198 | -603 to 211 | -115 | -241 to 14 | -277 | -745 to 225 |
| Age of carers | -2.5 | -13 to 4.6 | -24* | -42 to -5.3 | -16 | -32 to 0.6 | -8.4* | -15 to -2.2 | -27* | -46 to -6.4 |
| Education level of carers | | | | | | | | | | |
| Less than primary | Reference | | Reference | | Reference | | Reference | | Reference | |
| Completed primary | 175* | 20 to 397 | -880 | -2285 to 385 | -741 | -2149 to 492 | -139 | -395 to 69 | -705 | -2123 to 566 |
| Completed secondary | -6.5 | -169 to 126 | -970 | -2363 to 470 | -778 | -2222 to 645 | -192 | -492 to 47 | -976 | -2402 to 430 |
| Completed tertiary | 62 | -163 to 279 | -762 | -2253 to 620 | -745 | -2259 to 615 | -17 | -362 to 273 | -700 | -2164 to 710 |
| Marital status of carers | | | | | | | | | | |
| Single | Reference | | Reference | | Reference | | Reference | | Reference | |
| Married | 14 | -116 to 149 | -637* | -1307 to -33 | -470 | -1076 to 52 | -167 | -322 to 1.1 | -623* | -1285 to -3.1 |
| Divorced/widowed | 2.6 | -161 to 183 | 33 | -1184 to 1165 | 384 | -753 to 1472 | -351* | -568 to -117 | 36 | -1162 to 1174 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Carers with paid work | -7.4 | -140 to 121 | 985* | 339 to 1696 | 524 | -24 to 1153 | 461* | 278 to 665 | 977* | 294 to 1728 |
| Carers' relationship to participants | | | | | | | | | | |
| Spouse | Reference | | Reference | | Reference | | Reference | | Reference | |
| Children | -95 | -384 to 112 | -1490* | -2175 to -724 | -1115* | -1742 to -452 | -375* | -575 to -180 | -1585* | -2327 to -805 |
| Children in law or other relatives | 55 | -258 to 333 | -710 | -1503 to 47 | -674* | -1345 to -29 | -35 | -279 to 214 | -654 | -1505 to 185 |
| Non-relative | -133 | -455 to 91 | 120 | -815 to 1121 | -717 | -1505 to 102 | 837* | 520 to 1187 | -13 | -946 to 1015 |
| Depression | 53 | -146 to 247 | 1499 | -88 to 3422 | 1551* | 49 to 3416 | -52 | -360 to 300 | 1552 | -59 to 3544 |
| Hypertension | 121* | 9.6 to 265 | -211 | -678 to 244 | -202 | -618 to 219 | -9.3 | -128 to 103 | -91 | -569 to 391 |
| Diabetes | 73 | -86 to 237 | 188 | -781 to 1120 | 109 | -751 to 986 | 78 | -176 to 374 | 261 | -705 to 1252 |
| Ischemic heart disease | -54 | -219 to 101 | -136 | -1107 to 803 | 89 | -822 to 1014 | -225* | -426 to -22 | -190 | -1198 to 779 |
| Stroke | 79 | -167 to 285 | 2798* | 1388 to 4324 | 2652* | 1400 to 4016 | 146 | -203 to 582 | 2877* | 1448 to 4445 |
| COPD | 253 | -58 to 605 | -481 | -1202 to 341 | -459 | -1147 to 332 | -22 | -238 to 246 | -228 | -970 to 593 |
| Number of physical impairment | 53 | -5.9 to 154 | 177 | -62 to 424 | 183 | -43 to 420 | -6.2 | -59 to 52 | 230 | -26 to 486 |
| Severity of dementia | -166* | -316 to -58 | -25 | -623 to 598 | | | | | | |
| No dementia | 32 | -96 to 170 | -476 | -1005 to 93 | Reference | | Reference | | Reference | |
| Questionable | -12* | -20 to -5.2 | 73* | 33 to 112 | 573* | 201 to 1016 | 22 | -93 to 130 | 703* | 250 to 1194 |
| Mild | | | | | 5182* | 3378 to 7089 | 987* | 441 to 1624 | 6285* | 4277 to 8466 |
| Moderate | Reference | | Reference | | 15418* | 11056 to 19890 | 2829* | 1515 to 4344 | 18203* | 13325 to 23153 |
| Severe | 56 | -102 to 201 | 987 | -252 to 2208 | 21153* | 11861 to 29556 | 2602 | -125 to 5478 | 23648* | 14071 to 31542 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Constant | -17 | -164 to 99 | 377 | -570 to 1407 | -1792 | -5263 to 2151 | -649 | -1630 to 281 | -1598 | -5474 to 2705 |
| $R^2$ | 0.03 | | 0.39 | | 0.37 | | 0.24 | | 0.38 | |
| Adjusted $R^2$ | 0.01 | | 0.38 | | 0.35 | | 0.22 | | 0.37 | |

* Significant at 95% level

**Table A3.7. Linear regression model of cost of dementia and other chronic diseases in Venezuela****

| Variables | Cost of medical care | | Cost of social care | | Cost of informal care | | Cost of paid home care | | Total cost | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Observed coefficients | Bootstrapped 95% confidence interval | Observed coefficients | Bootstrapped 95% confidence interval | Observed coefficients | Bootstrapped 95% confidence interval | Observed coefficients | Bootstrapped 95% confidence interval | Observed coefficients | Bootstrapped 95% confidence interval |
| Male | -52 | -267 to 140 | -29 | -529 to 520 | -67 | -529 to 427 | 38 | -52 to 151 | -81 | -634 to 520 |
| Age | -3.1 | -16 to 9 | 60* | 22 to 97 | 55* | 23 to 87 | 5 | -5 to 18 | 57* | 18 to 96 |
| Education level of participants | | | | | | | | | | |
| No education | Reference | | Reference | | Reference | | Reference | | Reference | |
| Less than primary | 135 | -107 to 514 | -159 | -1029 to 690 | -210 | -1104 to 623 | 51 | -49 to 163 | -24 | -934 to 933 |
| Completed primary | 120 | -69 to 348 | -264 | -1123 to 554 | -342 | -1134 to 426 | 77 | -57 to 222 | -144 | -1018 to 666 |
| Completed secondary or higher | 254 | -23 to 564 | 84 | -801 to 936 | -99 | -931 to 688 | 183 | -42 to 477 | 337 | -640 to 1224 |
| Marital status of participants | | | | | | | | | | |
| Single | Reference | | Reference | | Reference | | Reference | | Reference | |
| Married | -1.6 | -318 to 275 | 156 | -632 to 946 | 122 | -654 to 874 | 34 | -37 to 122 | 154 | -718 to 1013 |
| Divorced/widowed | -47 | -354 to 220 | 167 | -645 to 838 | 92 | -710 to 760 | 76* | 19 to 144 | 120 | -672 to 875 |
| Living arrangement of participants | | | | | | | | | | |
| Living alone | Reference | | Reference | | Reference | | Reference | | Reference | |
| Living with spouse | 3.7 | -272 to 289 | 1001* | 331 to 1786 | 893* | 306 to 1606 | 108 | -28 to 328 | 1005* | 223 to 1904 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Living with children | 149 | -86 to 432 | 591* | 52 to 1210 | 516* | 11 to 1089 | 75* | 2.8 to 171 | 740* | 136 to 1449 |
| Living with other relatives | 15 | -308 to 354 | 684 | -207 to 1596 | 668 | -163 to 1527 | 16 | -79 to 102 | 698 | -212 to 1712 |
| Living with children under 16 | -112 | -361 to 94 | 42 | -354 to 401 | -3.3 | -375 to 340 | 45 | -23 to 136 | -69 | -527 to 364 |
| Participants with any income | -3.7 | -189 to 162 | 189 | -250 to 608 | 226 | -148 to 612 | -37 | -166 to 62 | 185 | -297 to 624 |
| Number of assets in the family | 29 | -18 to 87 | -94 | -338 to 119 | -110 | -350 to 105 | 15 | -5.8 to 44 | -65 | -307 to 162 |
| Participant has private insurance | 153* | 3.5 to 348 | -210 | -526 to 88 | -232 | -531 to 48 | 23 | -39 to 85 | -56 | -407 to 278 |
| Male carers | -54 | -236 to 105 | 165 | -249 to 596 | 94 | -253 to 475 | 72 | -34 to 207 | 111 | -338 to 578 |
| Age of carers | 5.3 | -4.8 to 17 | -8.9 | -27 to 10 | -7.7 | -23 to 9.8 | -1.3 | -7.3 to 3.8 | -3.7 | -23 to 19 |
| Education level of carers | | | | | | | | | | |
| Less than primary | Reference | | Reference | | Reference | | Reference | | Reference | |
| Completed primary | -279 | -936 to 179 | -357 | -1334 to 526 | -140 | -891 to 557 | -217 | -624 to 23 | -636 | -1779 to 499 |
| Completed secondary | -287 | -926 to 170 | -317 | -1408 to 671 | -86 | -939 to 701 | -231 | -693 to 55 | -604 | -1837 to 555 |
| Completed tertiary | -308 | -966 to 178 | -643 | -1718 to 291 | -396 | -1235 to 348 | -248 | -710 to 39 | -952 | -2168 to 146 |
| Marital status of carers | | | | | | | | | | |
| Single | Reference | | Reference | | Reference | | Reference | | Reference | |
| Married | -174 | -374 to 6.8 | 264 | -287 to 854 | 223 | -268 to 779 | 41 | -63 to 179 | 90 | -505 to 695 |
| Divorced/widowed | 9.3 | -318 to 448 | 169 | -346 to 663 | 96 | -347 to 538 | 73 | -55 to 235 | 178 | -420 to 814 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Carers with paid work | -34 | -189 to 174 | -223 | -616 to 140 | -311 | -678 to 7 | 87* | 9.8 to 184 | -258 | -676 to 154 |
| Carers' relationship to participants | | | | | | | | | | |
| Spouse | Reference | | Reference | | Reference | | Reference | | Reference | |
| Children | 43 | -311 to 406 | 167 | -556 to 1033 | 140 | -556 to 960 | 26 | -99 to 187 | 209 | -646 to 1151 |
| Children in law or other relatives | 120 | -337 to 653 | 503 | -357 to 1418 | 493 | -329 to 1392 | 10 | -122 to 168 | 623 | -359 to 1644 |
| Non-relative | -67 | -440 to 277 | 417 | -384 to 1418 | 302 | -421 to 1207 | 115 | -86 to 415 | 350 | -592 to 1440 |
| Dementia | 296 | -212 to 1171 | 3201* | 1584 to 5139 | 2986* | 1468 to 4861 | 215 | -30 to 542 | 3497* | 1705 to 5584 |
| Depression | 466 | -152 to 1490 | 1737* | 274 to 3591 | 1674* | 292 to 3410 | 63 | -142 to 312 | 2203* | 544 to 4285 |
| Hypertension | 15 | -250 to 203 | 38 | -284 to 332 | 103 | -166 to 363 | -65 | -177 to 26 | 53 | -326 to 410 |
| Diabetes | 72 | -116 to 258 | 657* | 122 to 1231 | 619* | 115 to 1188 | 38 | -47 to 131 | 729* | 225 to 1325 |
| Ischemic heart disease | 61 | -167 to 290 | -276 | -1039 to 543 | -246 | -972 to 556 | -29 | -134 to 75 | -215 | -988 to 585 |
| Stroke | 256 | -131 to 679 | 776 | -390 to 1884 | 816 | -269 to 1899 | -41 | -146 to 57 | 1032 | -234 to 2240 |
| COPD | -48 | -298 to 245 | -111 | -808 to 653 | -212 | -862 to 476 | 100 | -69 to 317 | -159 | -893 to 665 |
| Number of physical impairment | 32 | -30 to 84 | 125* | 7.5 to 241 | 107 | -4.2 to 208 | 18 | -5.2 to 49 | 156* | 18 to 288 |
| Constant | 326 | -783 to 1520 | -4073* | -7344 to -937 | -3496* | -6325 to -690 | -577 | -1400 to 80 | -3747* | -7123 to -526 |
| $R^2$ | 0.04 | | 0.14 | | 0.15 | | 0.03 | | 0.14 | |
| Adjusted $R^2$ | 0.01 | | 0.12 | | 0.13 | | 0.01 | | 0.12 | |

* Significant at 95% level

** Sample in Venezuela only came from urban area.

**Table A3.8. Linear regression model of cost of dementia in each level of severity in Venezuela ****

| Variables | Cost of medical care | | Cost of social care | | Cost of informal care | | Cost of paid home care | | Total cost | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Observed coefficients | Bootstrapped 95% confidence interval | Observed coefficients | Bootstrapped 95% confidence interval | Observed coefficients | Bootstrapped 95% confidence interval | Observed coefficients | Bootstrapped 95% confidence interval | Observed coefficients | Bootstrapped 95% confidence interval |
| Male | -25 | -234 to 154 | 39 | -444 to 537 | 0.6 | -441 to 433 | 38 | -53 to 155 | 14 | -517 to 527 |
| Age | -6.4 | -21 to 6.4 | 52* | 12 to 93 | 46* | 12 to 81 | 5.8 | -4.7 to 19 | 45* | 2.9 to 88 |
| Education level of participants | | | | | | | | | | |
| No education | Reference | | Reference | | Reference | | Reference | | Reference | |
| Less than primary | 187 | -98 to 599 | -26 | -852 to 766 | -74 | -903 to 740 | 48 | -57 to 161 | 162 | -721 to 1069 |
| Completed primary | 198 | -50 to 519 | 3.6 | -789 to 731 | -75 | -834 to 620 | 79 | -57 to 225 | 202 | -682 to 971 |
| Completed secondary or higher | 314 | -17 to 716 | 239 | -663 to 1071 | 59 | -713 to 794 | 180 | -44 to 478 | 554 | -390 to 1465 |
| Marital status of participants | | | | | | | | | | |
| Single | Reference | | Reference | | Reference | | Reference | | Reference | |
| Married | -13 | -335 to 266 | 96 | -630 to 858 | 67 | -656 to 813 | 29 | -39 to 113 | 83 | -689 to 958 |
| Divorced/widowed | -51 | -353 to 217 | 169 | -594 to 875 | 96 | -670 to 767 | 73* | 16 to 143 | 118 | -627 to 846 |
| Living arrangement of participants | | | | | | | | | | |
| Living alone | Reference | | Reference | | Reference | | Reference | | Reference | |
| Living with spouse | -45 | -341 to 262 | 848* | 211 to 1618 | 742* | 167 to 1370 | 106 | -31 to 323 | 803* | 120 to 1609 |
| Living with children | 117 | -88 to 348 | 577* | 94 to 1146 | 501* | 45 to 1024 | 76* | 1.5 to 171 | 694* | 172 to 1284 |
| Living with other relatives | -25 | -322 to 248 | 629 | -187 to 1519 | 614 | -164 to 1457 | 15 | -81 to 103 | 604 | -279 to 1542 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Living with children under 16 | -103 | -328 to 100 | 76 | -320 to 423 | 30 | -342 to 355 | 46 | -25 to 138 | -27 | -441 to 372 |
| Participants with any income | 17 | -138 to 169 | 297 | -109 to 698 | 334* | 0.3 to 690 | -37 | -166 to 62 | 314 | -108 to 723 |
| Number of assets in the family | 23 | -19 to 69 | -142 | -383 to 58 | -156 | -400 to 45 | 13 | -5 to 39 | -119 | -360 to 99 |
| Participant has private insurance | 147* | 0.8 to 322 | -254 | -573 to 42 | -277 | -568 to 2.6 | 23 | -40 to 89 | -107 | -439 to 201 |
| Male carers | -52 | -223 to 106 | 147 | -249 to 553 | 78 | -264 to 411 | 68 | -37 to 207 | 94 | -331 to 522 |
| Age of carers | 5.9 | -3.7 to 18 | -6.7 | -24 to 13 | -5.5 | -22 to 12 | -1.3 | -7.3 to 3.8 | -0.8 | -20 to 22 |
| Education level of carers | | | | | | | | | | |
| Less than primary | Reference | | Reference | | Reference | | Reference | | Reference | |
| Completed primary | -330 | -967 to 136 | -517 | -1475 to 295 | -302 | -984 to 335 | -216 | -619 to 34 | -847 | -1912 to 203 |
| Completed secondary | -289 | -911 to 175 | -281 | -1373 to 662 | -53 | -851 to 660 | -228 | -689 to 55 | -570 | -1747 to 486 |
| Completed tertiary | -291 | -902 to 189 | -557 | -1660 to 367 | -311 | -1116 to 406 | -246 | -704 to 38 | -848 | -2068 to 200 |
| Marital status of carers | | | | | | | | | | |
| Single | Reference | | Reference | | Reference | | Reference | | Reference | |
| Married | -179* | -372 to -0.2 | 225 | -297 to 761 | 181 | -302 to 692 | 44 | -55 to 183 | 46 | -518 to 615 |
| Divorced/widowed | -3.7 | -317 to 349 | 71 | -451 to 601 | 1.3 | -429 to 461 | 69 | -57 to 234 | 67 | -485 to 660 |
| Carers with paid work | -28 | -191 to 171 | -217 | -597 to 138 | -301 | -662 to 6.7 | 84* | 7.4 to 182 | -245 | -665 to 144 |
| Carers' relationship to participants | | | | | | | | | | |
| Spouse | Reference | | Reference | | Reference | | Reference | | Reference | |
| Children | 29 | -330 to 394 | 77 | -624 to 931 | 51 | -588 to 831 | 27 | -102 to 187 | 107 | -682 to 1034 |
| Children in law or other relatives | 120 | -375 to 649 | 427 | -316 to 1284 | 419 | -295 to 1223 | 8.3 | -120 to 153 | 547 | -329 to 1516 |
| Non-relative | -71 | -443 to 274 | 370 | -427 to 1350 | 258 | -426 to 1084 | 113 | -90 to 411 | 299 | -640 to 1315 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Depression | 458 | -169 to 1358 | 1639* | 243 to 3362 | 1571* | 284 to 3192 | 67 | -133 to 303 | 2096* | 543 to 3875 |
| Hypertension | 13 | -210 to 194 | 44 | -248 to 325 | 109 | -133 to 356 | -65 | -178 to 27 | 57 | -277 to 389 |
| Diabetes | 30 | -179 to 238 | 582* | 71 to 1144 | 541* | 42 to 1054 | 41 | -39 to 128 | 612* | 95 to 1220 |
| Ischemic heart disease | 94 | -134 to 327 | -285 | -1012 to 534 | -252 | -951 to 533 | -33 | -146 to 67 | -190 | -933 to 601 |
| Stroke | 217 | -222 to 668 | 621 | -471 to 1654 | 658 | -404 to 1690 | -37 | -134 to 47 | 838 | -388 to 2043 |
| COPD | -14 | -248 to 266 | 0.4 | -695 to 782 | -102 | -725 to 552 | 102 | -66 to 313 | -14 | -758 to 769 |
| Number of physical impairment | 30 | -28 to 82 | 117 | -5.8 to 238 | 100 | -7.7 to 205 | 17 | -7.2 to 50 | 147* | 16 to 277 |
| Severity of dementia | | | | | | | | | | |
| No dementia | Reference | | Reference | | Reference | | Reference | | Reference | |
| Questionable | 112 | -40 to 288 | 234 | -58 to 529 | 220 | -47 to 486 | 14 | -58 to 91 | 346* | 3.3 to 682 |
| Mild | -70 | -343 to 206 | 1754* | 293 to 3256 | 1644* | 272 to 3073 | 110 | -122 to 431 | 1685* | 153 to 3262 |
| Moderate | 2073 | -385 to 6802 | 10194* | 4099 to 16375 | 10003* | 4110 to 15863 | 191 | -157 to 768 | 12268* | 5214 to 19031 |
| Severe *** | - | - | - | - | - | - | - | - | - | - |
| Constant | 475 | -621 to 1690 | -3510* | -6993 to -305 | -2893 | -5844 to 11 | -617 | -1531 to 106 | -3035 | -6608 to 442 |
| $R^2$ | 0.05 | | 0.19 | | 0.20 | | 0.03 | | 0.21 | |
| Adjusted $R^2$ | 0.02 | | 0.17 | | 0.18 | | 0.01 | | 0.19 | |

* Significant at 95% level

** Sample in Venezuela only came from urban area.

*** Results were omitted because the case of severe dementia was very small.

**Table A3.9. Linear regression model of cost of dementia and other chronic diseases in Mexico**

| Variables | Cost of medical care | | Cost of social care | | Cost of informal care | | Cost of paid home care | | Total cost | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Observed coefficients | Bootstrapped 95% confidence interval | Observed coefficients | Bootstrapped 95% confidence interval | Observed coefficients | Bootstrapped 95% confidence interval | Observed coefficients | Bootstrapped 95% confidence interval | Observed coefficients | Bootstrapped 95% confidence interval |
| Rural area | -69 | -196 to 50 | -252 | -759 to 288 | -255 | -765 to 283 | 2.7 | -14 to 26 | -321 | -872 to 212 |
| Male | 13 | -95 to 131 | -155 | -537 to 271 | -151 | -530 to 268 | -4.3 | -25 to 13 | -143 | -546 to 297 |
| Age | 0.7 | -6.2 to 8 | 65* | 26 to 107 | 65* | 26 to 107 | 0.2 | -1.4 to 2 | 66* | 26 to 107 |
| Education level of participants | | | | | | | | | | |
| No education | Reference | | Reference | | Reference | | Reference | | Reference | |
| Less than primary | 12 | -101 to 125 | 307 | -177 to 733 | 302 | -186 to 729 | 5.2 | -3.5 to 17 | 318 | -176 to 789 |
| Completed primary | -33 | -170 to 104 | 497 | -229 to 1271 | 457 | -252 to 1220 | 40 | -2.2 to 95 | 464 | -264 to 1266 |
| Completed secondary or higher | 108 | -67 to 287 | 182 | -496 to 912 | 192 | -484 to 928 | -9.5 | -31 to 7.5 | 290 | -451 to 1048 |
| Marital status of participants | | | | | | | | | | |
| Single | Reference | | Reference | | Reference | | Reference | | Reference | |
| Married | 77 | -59 to 194 | -697 | -1850 to 366 | -708 | -1863 to 361 | 11 | -3.6 to 30 | -620 | -1808 to 443 |
| Divorced/widowed | 91 | -38 to 219 | -658 | -1816 to 361 | -681 | -1859 to 338 | 23* | 0.4 to 51 | -567 | -1748 to 502 |
| Living arrangement of participants | | | | | | | | | | |
| Living alone | Reference | | Reference | | Reference | | Reference | | Reference | |
| Living with spouse | -200 | -467 to 25 | 524 | -77 to 1105 | 533 | -67 to 1101 | -9.1 | -70 to 40 | 324 | -315 to 935 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Living with children | -223 | -515 to 20 | 419 | -159 to 995 | 427 | -158 to 999 | -7.8 | -72 to 43 | 196 | -446 to 875 |
| Living with other relatives | -90 | -381 to 169 | 889* | 10 to 1774 | 895* | 4.8 to 1781 | -6.7 | -68 to 45 | 798 | -145 to 1744 |
| Living with children under 16 | -3.1 | -110 to 91 | 213 | -295 to 692 | 219 | -285 to 697 | -6.4 | -27 to 9.9 | 209 | -331 to 695 |
| Participants with any income | 7.6 | -109 to 112 | -348 | -800 to 96 | -351 | -801 to 95 | 3.7 | -11 to 19 | -340 | -792 to 145 |
| Number of assets in the family | 24 | -4 to 54 | 144* | 21 to 279 | 140* | 18 to 275 | 3.7 | -0.9 to 9.5 | 167* | 34 to 315 |
| Participant has private insurance | 223* | 138 to 316 | -198 | -590 to 221 | -197 | -596 to 228 | -1.7 | -21 to 16 | 25 | -401 to 470 |
| Male carers | -65 | -166 to 44 | -194 | -557 to 156 | -185 | -552 to 157 | -8.7 | -32 to 14 | -259 | -649 to 97 |
| Age of carers | -0.8 | -5 to 3.3 | -10 | -28 to 7.5 | -10 | -28 to 7.4 | 0.2 | -0.4 to 1 | -11 | -30 to 7.5 |
| Education level of carers | | | | | | | | | | |
| Less than primary | Reference | | Reference | | Reference | | Reference | | Reference | |
| Completed primary | 16 | -96 to 148 | -676 | -1387 to 33 | -664 | -1374 to 42 | -11 | -31 to 4.1 | -660 | -1390 to 46 |
| Completed secondary | 151* | 18 to 296 | -731 | -1483 to 14 | -728 | -1493 to 6 | -2.9 | -30 to 22 | -579 | -1378 to 199 |
| Completed tertiary | 58 | -67 to 193 | -867* | -1726 to -80 | -867* | -1723 to -97 | -0.3 | -32 to 37 | -809* | -1680 to -37 |
| Marital status of carers | | | | | | | | | | |
| Single | Reference | | Reference | | Reference | | Reference | | Reference | |
| Married | 79 | -19 to 185 | 256 | -173 to 697 | 240 | -191 to 677 | 16 | 0 to 36 | 335 | -118 to 791 |
| Divorced/widowed | 12 | -171 to 257 | 69 | -577 to 727 | 33 | -605 to 677 | 35 | -5.3 to 99 | 81 | -603 to 789 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Carers with paid work | 80 | -26 to 198 | -305 | -711 to 71 | -328 | -735 to 53 | 23* | 1.2 to 48 | -225 | -645 to 186 |
| Carers' relationship to participants | | | | | | | | | | |
| Spouse | Reference | | Reference | | Reference | | Reference | | Reference | |
| Children | 5.5 | -259 to 222 | -513 | -1443 to 363 | -519 | -1443 to 354 | 6.3 | -6.8 to 22 | -507 | -1448 to 395 |
| Children in law or other relatives | -17 | -285 to 206 | -862 | -1870 to 138 | -864 | -1873 to 139 | 1.7 | -12 to 14 | -880 | -1875 to 150 |
| Non-relative | -2.6 | -351 to 352 | -822 | -1838 to 250 | -837 | -1849 to 188 | 15 | -42 to 84 | -825 | -1934 to 322 |
| Dementia | 16 | -139 to 211 | 4765* | 3304 to 6244 | 4720* | 3272 to 6219 | 45 | -20 to 127 | 4781* | 3300 to 6299 |
| Depression | -34 | -241 to 224 | 495 | -599 to 1738 | 439 | -687 to 1683 | 56 | -19 to 196 | 461 | -678 to 1753 |
| Hypertension | 65 | -21 to 147 | -230 | -615 to 141 | -219 | -609 to 157 | -10 | -29 to 3.4 | -165 | -588 to 242 |
| Diabetes | 102 | -16 to 219 | 679* | 175 to 1216 | 682* | 176 to 1214 | -2.2 | -20 to 14 | 781* | 267 to 1322 |
| Ischemic heart disease | -116 | -277 to 27 | 9.8 | -1232 to 1661 | -150 | -1307 to 1399 | 159 | -8.5 to 432 | -106 | -1372 to 1541 |
| Stroke | 237* | 20 to 495 | 1819* | 785 to 2922 | 1832* | 793 to 2925 | -13 | -37 to 3.1 | 2056* | 952 to 3219 |
| COPD | -94 | -211 to 30 | 93 | -788 to 1148 | 106 | -767 to 1167 | -13* | -30 to -0.4 | -1.6 | -922 to 1136 |
| Number of physical impairment | 37* | 3.6 to 74 | 201* | 31 to 392 | 202* | 32 to 392 | -0.6 | -8.1 to 7.9 | 238* | 63 to 434 |
| Constant | 84 | -545 to 694 | -3039 | -6377 to 378 | -2980 | -6293 to 405 | -58 | -219 to 54 | -2955 | -6412 to 504 |
| $R^2$ | 0.04 | | 0.17 | | 0.17 | | 0.04 | | 0.16 | |
| Adjusted $R^2$ | 0.03 | | 0.15 | | 0.15 | | 0.02 | | 0.15 | |

* Significant at 95% level

**Table A3.10. Linear regression model of cost of dementia in each level of severity in Mexico**

| Variables | Cost of medical care | | Cost of social care | | Cost of informal care | | Cost of paid home care | | Total cost | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Observed coefficients | Bootstrapped 95% confidence interval | Observed coefficients | Bootstrapped 95% confidence interval | Observed coefficients | Bootstrapped 95% confidence interval | Observed coefficients | Bootstrapped 95% confidence interval | Observed coefficients | Bootstrapped 95% confidence interval |
| Rural area | -61 | -185 to 60 | -285 | -775 to 270 | -285 | -777 to 268 | -0.2 | -20 to 14 | -346 | -876 to 217 |
| Male | 16 | -89 to 133 | -210 | -582 to 185 | -208 | -573 to 187 | -2.6 | -22 to 14 | -195 | -592 to 224 |
| Age | -0.1 | -7.8 to 9 | 77* | 38 to 117 | 77* | 37 to 117 | 0.3 | -0.9 to 2.2 | 77* | 37 to 117 |
| Education level of participants | | | | | | | | | | |
| No education | Reference | | Reference | | Reference | | Reference | | Reference | |
| Less than primary | 16 | -101 to 131 | 120 | -361 to 567 | 117 | -362 to 564 | 3.3 | -5.6 to 12 | 136 | -348 to 603 |
| Completed primary | -25 | -161 to 117 | 304 | -394 to 1057 | 270 | -429 to 1032 | 34 | -3.8 to 78 | 279 | -438 to 1044 |
| Completed secondary or higher | 111 | -60 to 288 | -35 | -665 to 593 | -22 | -660 to 604 | -13 | -34 to 2.7 | 76 | -620 to 716 |
| Marital status of participants | | | | | | | | | | |
| Single | Reference | | Reference | | Reference | | Reference | | Reference | |
| Married | 80 | -55 to 200 | -634 | -1726 to 389 | -645 | -1735 to 379 | 11 | -5.4 to 38 | -554 | -1673 to 477 |
| Divorced/widowed | 95 | -33 to 220 | -643 | -1733 to 362 | -662 | -1754 to 339 | 19 | 0 to 46 | -547 | -1665 to 481 |
| Living arrangement of participants | | | | | | | | | | |
| Living alone | Reference | | Reference | | Reference | | Reference | | Reference | |
| Living with spouse | -195 | -458 to 31 | 547 | -22 to 1085 | 560 | -22 to 1114 | -12 | -65 to 36 | 352 | -235 to 936 |
| Living with children | -219 | -514 to 23 | 391 | -177 to 882 | 404 | -153 to 896 | -13 | -66 to 36 | 172 | -441 to 768 |
| Living with other relatives | -86 | -373 to 173 | 825 | -56 to 1703 | 835 | -55 to 1713 | -9.4 | -62 to 43 | 740 | -192 to 1690 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Living with children under 16 | -7.3 | -115 to 87 | 116 | -339 to 579 | 123 | -328 to 590 | -7.3 | -31 to 7 | 109 | -385 to 594 |
| Participants with any income | 7.4 | -111 to 113 | -360 | -780 to 90 | -365 | -784 to 83 | 4.6 | -5.9 to 19 | -353 | -796 to 120 |
| Number of assets in the family | 25 | -2.3 to 54 | 111 | -4.6 to 243 | 109 | -8 to 242 | 1.8 | -1.9 to 5.3 | 136* | 8.1 to 281 |
| Participant has private insurance | 224* | 136 to 318 | -223 | -640 to 185 | -223 | -646 to 185 | 0 | -18 to 18 | 0.9 | -434 to 433 |
| Male carers | -67 | -168 to 40 | -309 | -638 to 54 | -297 | -614 to 61 | -11 | -35 to 4.1 | -376* | -714 to -17 |
| Age of carers | -0.7 | -4.9 to 3.4 | -12 | -31 to 5.4 | -13 | -31 to 5.7 | 0.1 | -0.5 to 0.7 | -13 | -32 to 5.8 |
| Education level of carers | | | | | | | | | | |
| Less than primary | Reference | | Reference | | Reference | | Reference | | Reference | |
| Completed primary | 20 | -90 to 148 | -629 | -1307 to 80 | -622 | -1294 to 81 | -7.3 | -31 to 9.9 | -610 | -1306 to 104 |
| Completed secondary | 159* | 26 to 299 | -676 | -1384 to 42 | -677 | -1371 to 37 | 0.9 | -29 to 25 | -517 | -1263 to 249 |
| Completed tertiary | 64 | -61 to 196 | -845* | -1621 to -19 | -845* | -1613 to -37 | 0.4 | -39 to 33 | -781 | -1572 to 28 |
| Marital status of carers | | | | | | | | | | |
| Single | Reference | | Reference | | Reference | | Reference | | Reference | |
| Married | 79 | -20 to 184 | 144 | -234 to 540 | 133 | -244 to 535 | 11 | -1 to 27 | 223 | -190 to 633 |
| Divorced/widowed | 11 | -174 to 255 | 82 | -548 to 691 | 45 | -573 to 657 | 37 | -4.3 to 102 | 93 | -565 to 761 |
| Carers with paid work | 83 | -22 to 201 | -325 | -707 to 40 | -347 | -726 to 25 | 22* | 0.6 to 45 | -242 | -640 to 140 |
| Carers' relationship to participants | | | | | | | | | | |
| Spouse | Reference | | Reference | | Reference | | Reference | | Reference | |
| Children | 8.2 | -259 to 224 | -468 | -1374 to 405 | -470 | -1375 to 410 | 1.4 | -12 to 13 | -460 | -1424 to 470 |
| Children in law or other relatives | -12 | -285 to 212 | -858 | -1818 to 132 | -853 | -1816 to 150 | -5.5 | -19 to 6.8 | -870 | -1859 to 130 |
| Non-relative | 13 | -351 to 375 | -711 | -1712 to 314 | -722 | -1707 to 261 | 11 | -47 to 73 | -698 | -1783 to 404 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Depression | -52 | -261 to 211 | 486 | -521 to 1620 | 426 | -619 to 1596 | 60 | -10 to 179 | 435 | -609 to 1628 |
| Hypertension | 66 | -22 to 147 | -135 | -502 to 229 | -131 | -500 to 234 | -4.4 | -18 to 6.4 | -69 | -442 to 312 |
| Diabetes | 100 | -18 to 219 | 595* | 94 to 1152 | 599* | 102 to 1152 | -3.8 | -23 to 14 | 695* | 181 to 1248 |
| Ischemic heart disease | -119 | -283 to 22 | 234 | -962 to 1901 | 69 | -1079 to 1632 | 164 | -1.8 to 435 | 115 | -1111 to 1769 |
| Stroke | 229* | 15 to 476 | 1553* | 553 to 2628 | 1568* | 559 to 2636 | -14 | -45 to 5 | 1782* | 721 to 2961 |
| COPD | -93 | -209 to 33 | 215 | -666 to 1278 | 226 | -654 to 1290 | -11 | -32 to 0.9 | 122 | -773 to 1230 |
| Number of physical impairment | 33* | 1.5 to 69 | 244* | 80 to 432 | 243* | 80 to 426 | 0.9 | -4.7 to 9.1 | 277* | 114 to 467 |
| Severity of dementia | | | | | | | | | | |
| No dementia | Reference | | Reference | | Reference | | Reference | | Reference | |
| Questionable | 66 | -22 to 153 | 94 | -232 to 422 | 106 | -227 to 426 | -11 | -31 to 2.5 | 160 | -187 to 504 |
| Mild | 125 | -86 to 400 | 4002* | 2568 to 5569 | 4013* | 2581 to 5586 | -12 | -38 to 6.1 | 4127* | 2608 to 5749 |
| Moderate | -26 | -272 to 295 | 10949* | 5691 to 17276 | 10659* | 5491 to 16945 | 290 | -29 to 915 | 10923* | 5791 to 17244 |
| Severe | 367 | -65 to 745 | 28239 | 0 to 40044 | 26775 | 0 to 40067 | 1464 | -48 to 2985 | 28606 | 0 to 40737 |
| Constant | 75 | -633 to 735 | -3272* | -6451 to -180 | -3234* | -6442 to -133 | -39 | -196 to 91 | -3197 | -6567 to 71 |
| $R^2$ | 0.05 | | 0.22 | | 0.21 | | 0.10 | | 0.21 | |
| Adjusted $R^2$ | 0.03 | | 0.20 | | 0.20 | | 0.09 | | 0.19 | |

* Significant at 95% level

**Table A3.11. Linear regression model of cost of dementia and other chronic diseases in China**

| Variables | Cost of medical care | | Cost of social care | | Cost of informal care | | Cost of paid home care | | Total cost | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Observed coefficients | Bootstrapped 95% confidence interval | Observed coefficients | Bootstrapped 95% confidence interval | Observed coefficients | Bootstrapped 95% confidence interval | Observed coefficients | Bootstrapped 95% confidence interval | Observed coefficients | Bootstrapped 95% confidence interval |
| Rural area | 8.5 | -69 to 92 | -592 | -1440 to 76 | -399 | -1136 to 166 | -193 | -387 to 0.4 | -584 | -1430 to 86 |
| Male | 9.5 | -74 to 82 | -889* | -1351 to -468 | -663* | -1029 to -305 | -226* | -359 to -79 | -880* | -1332 to -443 |
| Age | 3.7 | -0.9 to 9.2 | 91* | 48 to 135 | 61* | 24 to 96 | 30* | 18 to 42 | 95* | 53 to 139 |
| Education level of participants | | | | | | | | | | |
| No education | Reference | | Reference | | Reference | | Reference | | Reference | |
| Less than primary | 8.2 | -61 to 93 | 128 | -430 to 675 | 129 | -372 to 627 | -0.9 | -161 to 163 | 136 | -421 to 702 |
| Completed primary | 11 | -51 to 86 | 318 | -139 to 760 | 208 | -194 to 583 | 110 | -26 to 242 | 330 | -128 to 777 |
| Completed secondary or higher | 35 | -61 to 163 | 760* | 44 to 1422 | 460 | -115 to 1040 | 299* | 54 to 512 | 794* | 74 to 1506 |
| Marital status of participants | | | | | | | | | | |
| Single | Reference | | Reference | | Reference | | Reference | | Reference | |
| Married | -25 | -140 to 80 | -858 | -1781 to 53 | -709 | -1557 to 50 | -148 | -370 to 89 | -883 | -1872 to 17 |
| Divorced/widowed | -7.1 | -114 to 104 | -1110* | -2054 to -153 | -943* | -1799 to -131 | -166 | -395 to 75 | -1117* | -2133 to -133 |
| Living arrangement of participants | | | | | | | | | | |
| Living alone | Reference | | Reference | | Reference | | Reference | | Reference | |
| Living with spouse | -76 | -317 to 81 | 1144* | 200 to 2040 | 849* | 65 to 1569 | 296* | 25 to 516 | 1069* | 154 to 1963 |
| Living with children | -91 | -335 to 82 | 677 | -192 to 1499 | 515 | -198 to 1221 | 162 | -87 to 356 | 587 | -322 to 1379 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Living with other relatives | -133 | -376 to 36 | 986* | 7 to 1991 | 731 | -60 to 1573 | 255 | -29 to 483 | 853 | -155 to 1861 |
| Living with children under 16 | -17 | -71 to 30 | -138 | -571 to 285 | -58 | -444 to 298 | -80 | -188 to 28 | -154 | -600 to 265 |
| Participants with any income | 36 | -2 to 79 | -201 | -602 to 174 | -216 | -555 to 114 | 15 | -80 to 108 | -165 | -560 to 216 |
| Number of assets in the family | 11 | -9.4 to 33 | -11 | -163 to 141 | -43 | -177 to 83 | 32 | -7.1 to 73 | 0.5 | -160 to 151 |
| Participant has private insurance | 5.6 | -49 to 58 | 440 | -130 to 1178 | 408 | -146 to 1069 | 32 | -93 to 179 | 445 | -148 to 1186 |
| Male carers | -57 | -143 to 19 | -692* | -1147 to -254 | -676* | -1089 to -311 | -16 | -154 to 122 | -749* | -1211 to -304 |
| Age of carers | 0.6 | -2.4 to 4.1 | -39* | -68 to -11 | -25* | -48 to -1.1 | -15* | -23 to -6.4 | -39* | -67 to -10 |
| Education level of carers | | | | | | | | | | |
| Less than primary | Reference | | Reference | | Reference | | Reference | | Reference | |
| Completed primary | 56 | -24 to 134 | 183 | -366 to 721 | 252 | -228 to 716 | -70 | -201 to 68 | 239 | -328 to 795 |
| Completed secondary | 86 | -6.5 to 176 | -98 | -631 to 449 | 67 | -425 to 530 | -164 | -335 to 11 | -12 | -560 to 548 |
| Completed tertiary | 99 | -90 to 303 | 174 | -820 to 1007 | 350 | -502 to 1109 | -176 | -475 to 142 | 272 | -739 to 1141 |
| Marital status of carers | | | | | | | | | | |
| Single | Reference | | Reference | | Reference | | Reference | | Reference | |
| Married | -21 | -126 to 91 | 2032* | 760 to 3252 | 1552* | 494 to 2565 | 481* | 109 to 855 | 2011* | 748 to 3259 |
| Divorced/widowed | -76 | -223 to 72 | 2119* | 2.4 to 4317 | 1868* | 106 to 3755 | 251 | -292 to 749 | 2043 | -52 to 4194 |
| Carers with paid work | -14 | -86 to 72 | 70 | -530 to 747 | -43 | -544 to 503 | 113 | -64 to 290 | 56 | -532 to 730 |
| Carers' relationship to participants | | | | | | | | | | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Spouse | Reference | | Reference | | Reference | | Reference | | Reference | |
| Children | -65 | -150 to 15 | -332 | -1174 to 391 | -155 | -904 to 511 | -178 | -411 to 47 | -397 | -1238 to 343 |
| Children in law or other relatives | -110* | -240 to -14 | -590 | -1568 to 395 | -471 | -1294 to 306 | -119 | -402 to 216 | -700 | -1665 to 255 |
| Non-relative | -143 | -290 to 4.4 | 1220 | -277 to 2902 | 541 | -738 to 1841 | 678* | 273 to 1145 | 1077 | -423 to 2736 |
| Dementia | 148 | -71 to 463 | 8540* | 6729 to 10243 | 7344* | 5706 to 8821 | 1195* | 748 to 1683 | 8687* | 6857 to 10443 |
| Depression | 36 | -412 to 674 | 7624* | 1153 to 14926 | 8162* | 1333 to 15648 | -539 | -1255 to 336 | 7660* | 1315 to 14891 |
| Hypertension | -10 | -58 to 35 | -396* | -743 to -42 | -269 | -551 to 25 | -127* | -230 to -18 | -406* | -769 to -38 |
| Diabetes | 160* | 44 to 289 | 616 | -156 to 1430 | 416 | -218 to 1100 | 200 | -26 to 444 | 776* | 4 to 1595 |
| Ischemic heart disease | 75 | -115 to 310 | -207 | -1228 to 930 | -66 | -948 to 927 | -141 | -394 to 119 | -132 | -1177 to 1093 |
| Stroke | 259* | 26 to 528 | 3813* | 2336 to 5398 | 3070* | 1884 to 4392 | 743* | 321 to 1241 | 4072* | 2566 to 5620 |
| COPD | -164* | -323 to -20 | 2125* | 492 to 3927 | 2015* | 514 to 3730 | 110 | -394 to 664 | 1961* | 352 to 3765 |
| Number of physical impairment | 79* | 42 to 125 | 409* | 173 to 654 | 310* | 112 to 518 | 99* | 36 to 169 | 488* | 249 to 731 |
| Constant | -195 | -717 to 280 | -3525 | -7131 to 0.9 | -1999 | -4907 to 781 | -1526* | -2650 to -440 | -3720* | -7375 to -76 |
| $R^2$ | 0.09 | | 0.41 | | 0.40 | | 0.23 | | 0.42 | |
| Adjusted $R^2$ | 0.08 | | 0.40 | | 0.39 | | 0.22 | | 0.41 | |

* Significant at 95% level

**Table A3.12. Linear regression model of cost of dementia in each level of severity in China**

| Variables | Cost of medical care | | Cost of social care | | Cost of informal care | | Cost of paid home care | | Total cost | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Observed coefficients | Bootstrapped 95% confidence interval | Observed coefficients | Bootstrapped 95% confidence interval | Observed coefficients | Bootstrapped 95% confidence interval | Observed coefficients | Bootstrapped 95% confidence interval | Observed coefficients | Bootstrapped 95% confidence interval |
| Rural area | -3.8 | -80 to 76 | -580 | -1340 to 45 | -371 | -1044 to 184 | -209* | -390 to -20 | -584 | -1387 to 33 |
| Male | 12 | -68 to 83 | -777* | -1168 to -384 | -570* | -893 to -241 | -207* | -342 to -65 | -765* | -1167 to -353 |
| Age | 3.4 | -0.9 to 8.6 | 97* | 58 to 136 | 66* | 34 to 99 | 31* | 18 to 42 | 100* | 60 to 140 |
| Education level of participants | | | | | | | | | | |
| No education | Reference | | Reference | | Reference | | Reference | | Reference | |
| Less than primary | 25 | -44 to 110 | 290 | -258 to 805 | 270 | -229 to 740 | 20 | -135 to 174 | 315 | -232 to 843 |
| Completed primary | 18 | -48 to 96 | 351 | -141 to 775 | 241 | -160 to 614 | 110 | -28 to 235 | 370 | -120 to 802 |
| Completed secondary or higher | 42 | -55 to 173 | 766* | 33 to 1436 | 468 | -121 to 1002 | 298* | 58 to 511 | 808* | 118 to 1480 |
| Marital status of participants | | | | | | | | | | |
| Single | Reference | | Reference | | Reference | | Reference | | Reference | |
| Married | -30 | -144 to 75 | -940* | -1803 to -67 | -784* | -1551 to -64 | -156 | -372 to 76 | -970* | -1870 to -81 |
| Divorced/widowed | -3.6 | -106 to 99 | -921* | -1763 to -38 | -786* | -1545 to -37 | -136 | -347 to 96 | -925* | -1802 to -36 |
| Living arrangement of participants | | | | | | | | | | |
| Living alone | Reference | | Reference | | Reference | | Reference | | Reference | |
| Living with spouse | -63 | -283 to 90 | 1334* | 323 to 2140 | 1013* | 195 to 1730 | 321* | 67 to 525 | 1270* | 308 to 2071 |
| Living with children | -82 | -305 to 84 | 770 | -175 to 1583 | 599 | -142 to 1307 | 172 | -73 to 372 | 688 | -223 to 1439 |
| Living with other relatives | -123 | -344 to 37 | 1100* | 128 to 1987 | 837* | 37 to 1642 | 264 | -12 to 477 | 977* | 1.2 to 1867 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Living with children under 16 | -19 | -72 to 30 | -124 | -494 to 229 | -48 | -374 to 257 | -76 | -185 to 30 | -142 | -515 to 202 |
| Participants with any income | 32 | -5 to 75 | -234 | -601 to 95 | -244 | -558 to 41 | 10 | -85 to 100 | -201 | -576 to 147 |
| Number of assets in the family | 15 | -5.3 to 36 | 31 | -110 to 172 | -6.9 | -126 to 112 | 38 | -0.4 to 77 | 46 | -97 to 187 |
| Participant has private insurance | 14 | -40 to 69 | 460 | -61 to 1098 | 427 | -32 to 982 | 32 | -92 to 176 | 474 | -68 to 1123 |
| Male carers | -49 | -127 to 25 | -527* | -981 to -88 | -539* | -936 to -152 | 11 | -127 to 152 | -576* | -1022 to -143 |
| Age of carers | 1.1 | -2 to 4.7 | -25 | -50 to 1.9 | -12 | -33 to 11 | -12* | -20 to -3.7 | -24 | -48 to 3.6 |
| Education level of carers | | | | | | | | | | |
| Less than primary | Reference | | Reference | | Reference | | Reference | | Reference | |
| Completed primary | 60 | -24 to 137 | 260 | -233 to 746 | 322 | -104 to 741 | -62 | -196 to 70 | 320 | -191 to 845 |
| Completed secondary | 86 | -11 to 178 | -89 | -570 to 484 | 76 | -358 to 553 | -166 | -335 to 14 | -3.7 | -503 to 580 |
| Completed tertiary | 96 | -82 to 289 | 107 | -789 to 975 | 300 | -465 to 1026 | -193 | -479 to 144 | 203 | -745 to 1081 |
| Marital status of carers | | | | | | | | | | |
| Single | Reference | | Reference | | Reference | | Reference | | Reference | |
| Married | -56 | -166 to 61 | 1417* | 489 to 2372 | 1023* | 262 to 1784 | 394* | 43 to 743 | 1361* | 437 to 2366 |
| Divorced/widowed | -85 | -219 to 70 | 1391 | -477 to 3471 | 1250 | -325 to 2951 | 141 | -341 to 641 | 1306 | -572 to 3362 |
| Carers with paid work | -10 | -86 to 74 | 84 | -490 to 714 | -31 | -526 to 499 | 114 | -59 to 287 | 74 | -494 to 722 |
| Carers' relationship to participants | | | | | | | | | | |
| Spouse | Reference | | Reference | | Reference | | Reference | | Reference | |
| Children | -60 | -145 to 22 | -62 | -866 to 667 | 76 | -582 to 703 | -138 | -365 to 82 | -122 | -895 to 623 |
| Children in law or other relatives | -105* | -235 to -5.7 | -334 | -1221 to 615 | -262 | -971 to 491 | -72 | -350 to 256 | -439 | -1322 to 494 |
| Non-relative | -133 | -271 to 7.2 | 1484* | 81 to 2964 | 774 | -351 to 2002 | 710* | 319 to 1169 | 1351 | -52 to 2837 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Depression | -48 | -660 to 625 | 6846* | 845 to 13525 | 7519* | 1229 to 14385 | -673 | -1638 to 307 | 6798* | 962 to 13395 |
| Hypertension | -4.7 | -54 to 41 | -324 | -631 to 7.6 | -208 | -474 to 83 | -117* | -217 to -11 | -329 | -670 to 21 |
| Diabetes | 158* | 40 to 289 | 591 | -137 to 1368 | 395 | -237 to 1045 | 196 | -24 to 427 | 749* | 4.5 to 1535 |
| Ischemic heart disease | 70 | -109 to 287 | -181 | -1125 to 831 | -51 | -847 to 873 | -129 | -378 to 115 | -110 | -1055 to 931 |
| Stroke | 214 | -27 to 458 | 2903* | 1434 to 4289 | 2316* | 1115 to 3449 | 588* | 163 to 1049 | 3117* | 1676 to 4507 |
| COPD | -192* | -380 to -41 | 1364 | -151 to 3232 | 1390 | -152 to 3199 | -26 | -461 to 545 | 1172 | -368 to 3015 |
| Number of physical impairment | 78* | 40 to 122 | 360* | 148 to 578 | 266* | 82 to 451 | 94* | 29 to 166 | 438* | 219 to 657 |
| Severity of dementia | | | | | | | | | | |
| No dementia | Reference | | Reference | | Reference | | Reference | | Reference | |
| Questionable | -17 | -78 to 37 | 165 | -161 to 541 | 201 | -58 to 513 | -35 | -136 to 82 | 149 | -183 to 531 |
| Mild | -14 | -167 to 193 | 6303* | 4487 to 8257 | 5234* | 3644 to 6931 | 1068* | 531 to 1632 | 6288* | 4471 to 8219 |
| Moderate | 662 | -56 to 1685 | 16169* | 12925 to 19228 | 13943* | 10740 to 16913 | 2226* | 1239 to 3332 | 16830* | 13682 to 20027 |
| Severe | -150 | -690 to 177 | 22591 | 0 to 34095 | 18948 | 0 to 28450 | 3643 | 0 to 5860 | 22441 | 0 to 33599 |
| Constant | -210 | -743 to 259 | -5129* | -8612 to -1766 | -3418* | -6132 to -733 | -1711* | -2807 to -643 | -5339* | -8785 to -1860 |
| $R^2$ | 0.11 | | 0.49 | | 0.48 | | 0.27 | | 0.50 | |
| Adjusted $R^2$ | 0.09 | | 0.48 | | 0.47 | | 0.25 | | 0.49 | |

* Significant at 95% level

**Table A3.13. Linear regression model of cost of dementia and other chronic diseases in India****

| Variables | Cost of medical care | | Cost of social care | | Cost of informal care | | Total cost | |
|---|---|---|---|---|---|---|---|---|
| | Observed coefficients | Bootstrapped 95% confidence interval | Observed coefficients | Bootstrapped 95% confidence interval | Observed coefficients | Bootstrapped 95% confidence interval | Observed coefficients | Bootstrapped 95% confidence interval |
| Rural area | 34* | 1 to 95 | 345* | 105 to 577 | 345* | 105 to 577 | 379* | 134 to 619 |
| Male | 18 | -12 to 73 | -145 | -392 to 100 | -145 | -392 to 100 | -126 | -376 to 124 |
| Age | 3.6 | -1.6 to 13 | 14 | -2.1 to 31 | 14 | -2.1 to 31 | 18 | -1.5 to 38 |
| Education level of participants | | | | | | | | |
| No education | Reference | | Reference | | Reference | | Reference | |
| Less than primary | -76* | -216 to -5.7 | -148 | -372 to 102 | -148 | -372 to 102 | -224 | -501 to 58 |
| Completed primary | -73 | -223 to 1.8 | -4.1 | -342 to 348 | -4.1 | -342 to 348 | -77 | -449 to 320 |
| Completed secondary or higher | -61 | -206 to 8.5 | 234 | -238 to 736 | 234 | -238 to 736 | 173 | -318 to 671 |
| Marital status of participants | | | | | | | | |
| Single | Reference | | Reference | | Reference | | Reference | |
| Married | -15 | -129 to 35 | -443 | -1338 to 250 | -443 | -1338 to 250 | -458 | -1346 to 255 |
| Divorced/widowed | -12 | -108 to 38 | -413 | -1340 to 346 | -413 | -1340 to 346 | -426 | -1348 to 336 |
| Living arrangement of participants | | | | | | | | |
| Living alone | Reference | | Reference | | Reference | | Reference | |
| Living with spouse | 71 | -13 to 232 | 541* | 115 to 1010 | 541* | 115 to 1010 | 612* | 154 to 1099 |
| Living with children | 11 | -23 to 55 | 337 | -0.3 to 698 | 337 | -0.3 to 698 | 348* | 9.3 to 701 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Living with other relatives | 21 | -31 to 80 | 607* | 112 to 1197 | 607* | 112 to 1197 | 628* | 120 to 1215 |
| Living with children under 16 | 6.3 | -17 to 38 | -76 | -376 to 210 | -76 | -376 to 210 | -69 | -371 to 218 |
| Participants with any income | -3.5 | -39 to 38 | -720* | -1019 to -395 | -720* | -1019 to -395 | -723* | -1037 to -404 |
| Number of assets in the family | -5.7 | -21 to 2.8 | 38 | -26 to 103 | 38 | -26 to 103 | 32 | -34 to 98 |
| Participant has private insurance | 150* | 21 to 350 | 2054 | -450 to 6803 | 2054 | -450 to 6803 | 2204 | -273 to 6955 |
| Male carers | -21 | -80 to 11 | -67 | -371 to 267 | -67 | -371 to 267 | -88 | -400 to 264 |
| Age of carers | 0.4 | -1.9 to 3.1 | -2.1 | -12 to 8.4 | -2.1 | -12 to 8.4 | -1.7 | -12 to 9.4 |
| Education level of carers | | | | | | | | |
| Less than primary | Reference | | Reference | | Reference | | Reference | |
| Completed primary | 22 | -11 to 70 | -87 | -337 to 166 | -87 | -337 to 166 | -65 | -321 to 186 |
| Completed secondary | 12 | -15 to 52 | -153 | -463 to 184 | -153 | -463 to 184 | -142 | -447 to 219 |
| Completed tertiary | -1.4 | -110 to 64 | -83 | -584 to 459 | -83 | -584 to 459 | -85 | -613 to 477 |
| Marital status of carers | | | | | | | | |
| Single | Reference | | Reference | | Reference | | Reference | |
| Married | 16 | -26 to 62 | 194 | -112 to 512 | 194 | -112 to 512 | 209 | -95 to 538 |
| Divorced/widowed | 33 | -71 to 175 | 25 | -458 to 500 | 25 | -458 to 500 | 59 | -428 to 517 |
| Carers with paid work | -5.5 | -46 to 19 | 264* | 55 to 497 | 264* | 55 to 497 | 259* | 45 to 500 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Carers' relationship to participants | | | | | | | | |
| Spouse | Reference | | Reference | | Reference | | Reference | |
| Children | -31 | -114 to 30 | -82 | -505 to 372 | -82 | -505 to 372 | -113 | -540 to 350 |
| Children in law or other relatives | -39 | -122 to 15 | -46 | -473 to 404 | -46 | -473 to 404 | -85 | -520 to 358 |
| Non-relative | -51 | -169 to 26 | 23 | -513 to 673 | 23 | -513 to 673 | -28 | -580 to 601 |
| Dementia | -29 | -139 to 40 | 1793* | 1054 to 2548 | 1793* | 1054 to 2548 | 1764* | 1004 to 2517 |
| Depression | -19 | -129 to 44 | 608* | 116 to 1176 | 608* | 116 to 1176 | 588* | 92 to 1163 |
| Hypertension | -31 | -127 to 23 | -79 | -287 to 120 | -79 | -287 to 120 | -109 | -333 to 112 |
| Diabetes | 212* | 11 to 565 | 553* | 88 to 1112 | 553* | 88 to 1112 | 764* | 185 to 1399 |
| Ischemic heart disease | 9 | -69 to 64 | -364 | -702 to 34 | -364 | -702 to 34 | -355 | -716 to 46 |
| Stroke | 1066 | -31 to 3589 | 2185* | 544 to 4321 | 2185* | 544 to 4321 | 3251* | 634 to 6809 |
| COPD | -3.3 | -75 to 43 | 212 | -179 to 625 | 212 | -179 to 625 | 209 | -198 to 632 |
| Number of physical impairment | -13 | -63 to 14 | 90 | -3.8 to 184 | 90 | -3.8 to 184 | 76 | -32 to 188 |
| Constant | -195 | -775 to 154 | -415 | -1798 to 1124 | -415 | -1798 to 1124 | -610 | -2131 to 962 |
| $R^2$ | 0.05 | | 0.14 | | 0.14 | | 0.14 | |
| Adjusted $R^2$ | 0.04 | | 0.12 | | 0.12 | | 0.13 | |

* Significant at 95% level

** No paid home care was found in India.

**Table A3.14. Linear regression model of cost of dementia in each level of severity in India****

| Variables | Cost of medical care | | Cost of social care | | Cost of informal care | | Total cost | |
|---|---|---|---|---|---|---|---|---|
| | Observed coefficients | Bootstrapped 95% confidence interval | Observed coefficients | Bootstrapped 95% confidence interval | Observed coefficients | Bootstrapped 95% confidence interval | Observed coefficients | Bootstrapped 95% confidence interval |
| Rural area | 26 | -1.6 to 73 | 227 | -4.4 to 447 | 227 | -4.4 to 447 | 253* | 7 to 485 |
| Male | 17 | -12 to 76 | -238* | -481 to -13 | -238* | -481 to -13 | -221 | -463 to 0.8 |
| Age | 3 | -1.5 to 11 | 20* | 3.8 to 36 | 20* | 3.8 to 36 | 23* | 4.8 to 41 |
| Education level of participants | | | | | | | | |
| No education | Reference | | Reference | | Reference | | Reference | |
| Less than primary | -73* | -198 to -5 | -99 | -319 to 124 | -99 | -319 to 124 | -172 | -429 to 99 |
| Completed primary | -72 | -222 to 3 | 89 | -244 to 433 | 89 | -244 to 433 | 17 | -354 to 377 |
| Completed secondary or higher | -59 | -195 to 10 | 264 | -148 to 654 | 264 | -148 to 654 | 205 | -232 to 611 |
| Marital status of participants | | | | | | | | |
| Single | Reference | | Reference | | Reference | | Reference | |
| Married | -30 | -162 to 32 | -477 | -1369 to 215 | -477 | -1369 to 215 | -506 | -1395 to 203 |
| Divorced/widowed | -28 | -150 to 34 | -535 | -1474 to 242 | -535 | -1474 to 242 | -563 | -1494 to 228 |
| Living arrangement of participants | | | | | | | | |
| Living alone | Reference | | Reference | | Reference | | Reference | |
| Living with spouse | 74 | -12 to 245 | 525* | 102 to 982 | 525* | 102 to 982 | 600* | 139 to 1094 |
| Living with children | 17 | -19 to 81 | 336* | 21 to 689 | 336* | 21 to 689 | 353* | 30 to 718 |
| Living with other relatives | 23 | -33 to 89 | 473* | 1.4 to 1062 | 473* | 1.4 to 1062 | 496* | 6.2 to 1084 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Living with children under 16 | 9.1 | -14 to 47 | -95 | -402 to 174 | -95 | -402 to 174 | -86 | -403 to 195 |
| Participants with any income | 7.2 | -30 to 68 | -640* | -936 to -342 | -640* | -936 to -342 | -632* | -937 to -337 |
| Number of assets in the family | -3.7 | -16 to 3.3 | 16 | -42 to 78 | 16 | -42 to 78 | 12 | -48 to 76 |
| Participant has private insurance | 152* | 21 to 363 | 1522 | -409 to 4690 | 1522 | -409 to 4690 | 1674 | -218 to 4892 |
| Male carers | -20 | -78 to 11 | -106 | -406 to 185 | -106 | -406 to 185 | -127 | -446 to 177 |
| Age of carers | 0.4 | -1.8 to 3.1 | -4.4 | -13 to 5.1 | -4.4 | -13 to 5.1 | -4 | -13 to 5.6 |
| Education level of carers | | | | | | | | |
| Less than primary | Reference | | Reference | | Reference | | Reference | |
| Completed primary | 18 | -14 to 64 | -172 | -395 to 45 | -172 | -395 to 45 | -154 | -382 to 76 |
| Completed secondary | 11 | -17 to 50 | -136 | -424 to 198 | -136 | -424 to 198 | -125 | -415 to 212 |
| Completed tertiary | 6.7 | -94 to 86 | -316 | -722 to 53 | -316 | -722 to 53 | -309 | -716 to 82 |
| Marital status of carers | | | | | | | | |
| Single | Reference | | Reference | | Reference | | Reference | |
| Married | 19 | -22 to 75 | 281 | -48 to 613 | 281 | -48 to 613 | 300 | -36 to 634 |
| Divorced/widowed | 38 | -62 to 184 | 23 | -413 to 467 | 23 | -413 to 467 | 61 | -398 to 505 |
| Carers with paid work | -6.6 | -51 to 20 | 230* | 33 to 450 | 230* | 33 to 450 | 223* | 13 to 451 |
| Carers' relationship to participants | | | | | | | | |
| Spouse | Reference | | Reference | | Reference | | Reference | |
| Children | -32 | -120 to 31 | 10 | -372 to 450 | 10 | -372 to 450 | -22 | -419 to 425 |
| Children in law or other relatives | -47 | -142 to 14 | -51 | -380 to 309 | -51 | -380 to 309 | -98 | -457 to 257 |
| Non-relative | -50 | -168 to 27 | 44 | -444 to 683 | 44 | -444 to 683 | -5.8 | -514 to 641 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Depression | -33 | -174 to 44 | 666* | 199 to 1180 | 666* | 199 to 1180 | 632* | 156 to 1179 |
| Hypertension | -26 | -111 to 24 | 8.9 | -183 to 186 | 8.9 | -183 to 186 | -17 | -217 to 175 |
| Diabetes | 208* | 12 to 548 | 518* | 81 to 1026 | 518* | 81 to 1026 | 726* | 165 to 1319 |
| Ischemic heart disease | 10 | -72 to 68 | -421* | -675 to -187 | -421* | -675 to -187 | -411* | -698 to -150 |
| Stroke | 1040 | -31 to 3477 | 1645* | 284 to 3154 | 1645* | 284 to 3154 | 2685* | 398 to 5621 |
| COPD | 5.6 | -57 to 46 | 156 | -205 to 555 | 156 | -205 to 555 | 162 | -197 to 554 |
| Number of physical impairment | -18 | -74 to 13 | 78 | -8.3 to 173 | 78 | -8.3 to 173 | 60 | -52 to 173 |
| Severity of dementia | | | | | | | | |
| No dementia | Reference | | Reference | | Reference | | Reference | |
| Questionable | 10 | -14 to 40 | 114 | -83 to 295 | 114 | -83 to 295 | 125 | -73 to 301 |
| Mild | 277 | -17 to 852 | 1872* | 945 to 2918 | 1872* | 945 to 2918 | 2150* | 1066 to 3234 |
| Moderate | -100 | -596 to 93 | 8671* | 4874 to 12455 | 8671* | 4874 to 12455 | 8571* | 4900 to 12337 |
| Severe | 308 | -103 to 1038 | 12785 | 0 to 16729 | 12785 | 0 to 16729 | 13093 | 0 to 16696 |
| Constant | -167 | -678 to 144 | -489 | -1905 to 1010 | -489 | -1905 to 1010 | -656 | -2171 to 947 |
| $R^2$ | 0.06 | | 0.26 | | 0.26 | | 0.26 | |
| Adjusted $R^2$ | 0.04 | | 0.25 | | 0.25 | | 0.25 | |

* Significant at 95% level

** No paid home care was found in India.

**Table A3.15. Linear regression model of cost of dementia and other chronic diseases in Whole Sample**

| Variables | Cost of medical care | | Cost of social care | | Cost of informal care | | Cost of paid home care | | Total cost | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Observed coefficients | Bootstrapped 95% confidence interval | Observed coefficients | Bootstrapped 95% confidence interval | Observed coefficients | Bootstrapped 95% confidence interval | Observed coefficients | Bootstrapped 95% confidence interval | Observed coefficients | Bootstrapped 95% confidence interval |
| Rural area | -77* | -111 to -43 | -9.2 | -178 to 168 | -63 | -257 to 148 | 94* | 41 to 149 | 26 | -198 to 271 |
| Male | 5.8 | -34 to 45 | -198* | -361 to -42 | 1032* | 698 to 1397 | 228* | 144 to 311 | 1354* | 975 to 1754 |
| Age | -3* | -5.4 to -0.7 | 58* | 46 to 71 | 717* | 316 to 1168 | 103* | 33 to 189 | 760* | 322 to 1225 |
| Education level of participants | | | | | | | | | | |
| No education | Reference | | Reference | | Reference | | Reference | | Reference | |
| Less than primary | 10 | -33 to 51 | 55 | -144 to 254 | 284* | 52 to 511 | 52* | 2.9 to 105 | 561* | 297 to 810 |
| Completed primary | -19 | -60 to 21 | 110 | -108 to 328 | 814* | 506 to 1154 | -20 | -67 to 21 | 1065* | 749 to 1433 |
| Completed secondary or higher | 36 | -17 to 96 | 308* | 27 to 554 | 405* | 119 to 698 | 21 | -20 to 60 | 586* | 275 to 907 |
| Marital status of participants | | | | | | | | | | |
| Single | Reference | | Reference | | Reference | | Reference | | Reference | |
| Married | 30 | -27 to 82 | 42 | -323 to 382 | 1255* | 996 to 1534 | 481* | 391 to 579 | 1809* | 1494 to 2149 |
| Divorced/widowed | -5.9 | -63 to 45 | -3.3 | -353 to 316 | 708* | 417 to 1023 | 77* | 22 to 132 | 647* | 335 to 980 |
| Living arrangement of participants | | | | | | | | | | |
| Living alone | Reference | | Reference | | Reference | | Reference | | Reference | |
| Living with spouse | -87* | -163 to -22 | 932* | 701 to 1169 | 256* | 36 to 491 | 89* | 47 to 130 | 306* | 70 to 560 |
| Living with children | -60 | -139 to 7.3 | 736* | 523 to 942 | 222 | -0.08 to 469 | 72* | 24 to 115 | 273* | 10 to 549 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Living with other relatives | -119* | -203 to -45 | 986* | 693 to 1251 | -124 | -274 to 12 | -54* | -89 to -20 | -163* | -331 to -2.3 |
| Living with children under 16 | -21 | -67 to 26 | -119 | -286 to 36 | 48* | 37 to 59 | 9.7* | 6.6 to 13 | 55* | 42 to 68 |
| Participants with any income | 19 | -12 to 48 | -94 | -249 to 61 | 208* | 28 to 393 | 34 | -6.7 to 73 | 235* | 27 to 441 |
| Number of assets in the family | 11* | 0.01 to 23 | 65* | 15 to 118 | 167 | -26 to 369 | 39 | -8.3 to 85 | 185 | -38 to 401 |
| Participant has private insurance | 171* | 121 to 227 | 228* | 74 to 400 | 236 | -0.9 to 476 | 98* | 31 to 164 | 380* | 105 to 642 |
| Male carers | -42* | -77 to -3.8 | -133* | -258 to -6.1 | -133 | -459 to 179 | 31 | -41 to 101 | -81 | -441 to 265 |
| Age of carers | 0.2 | -1.8 to 2.2 | -8.6* | -15 to -2.7 | -85 | -415 to 205 | 9 | -66 to 69 | -66 | -417 to 262 |
| Education level of carers | | | | | | | | | | |
| Less than primary | Reference | | Reference | | Reference | | Reference | | Reference | |
| Completed primary | 37 | -7.2 to 84 | -125 | -312 to 75 | 656* | 462 to 857 | 167* | 107 to 221 | 750* | 503 to 983 |
| Completed secondary | 40 | -3.8 to 88 | -161 | -394 to 67 | 565* | 391 to 748 | 149* | 93 to 201 | 671* | 450 to 886 |
| Completed tertiary | 37 | -18 to 91 | -138 | -386 to 139 | 722* | 465 to 940 | 180* | 107 to 251 | 827* | 535 to 1097 |
| Marital status of carers | | | | | | | | | | |
| Single | Reference | | Reference | | Reference | | Reference | | Reference | |
| Married | -72* | -131 to -18 | -92 | -328 to 150 | -6.7 | -169 to 140 | -56* | -90 to -24 | -85 | -262 to 78 |
| Divorced/widowed | -69 | -147 to 2.9 | -294* | -579 to -12 | -132 | -281 to 24 | 32* | 0.3 to 64 | -90 | -254 to 81 |
| Carers with paid work | -13 | -45 to 20 | 39 | -107 to 193 | 23 | -25 to 72 | 25* | 16 to 35 | 53 | -1.5 to 107 |
| Carers' relationship to participants | | | | | | | | | | |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Spouse | Reference | | Reference | | Reference | | Reference | | Reference | |
| Children | -11 | -86 to 63 | -292* | -528 to -75 | -48 | -262 to 159 | 19 | -18 to 58 | 113 | -116 to 344 |
| Children in law or other relatives | 4.1 | -80 to 86 | -264* | -516 to -31 | -140* | -260 to -25 | -26 | -61 to 12 | -184* | -318 to -48 |
| Non-relative | -64 | -149 to 8.9 | 475* | 131 to 812 | -9.6* | -15 to -4.5 | -3.5* | -5.2 to -2 | -13* | -19 to -6.3 |
| Dementia | 72 | -6 to 176 | 487* | 115 to 909 | -92 | -272 to 97 | -40 | -81 to 1.3 | -113 | -318 to 98 |
| Depression | 23 | -15 to 55 | -189* | -324 to -45 | -185 | -399 to 36 | -77* | -125 to -32 | -231 | -465 to 10 |
| Hypertension | 102* | 53 to 156 | 303* | 103 to 534 | -156 | -395 to 116 | -59 | -125 to 0.6 | -201 | -468 to 105 |
| Diabetes | -18 | -61 to 30 | -211 | -490 to 54 | 65 | -149 to 285 | -37 | -98 to 23 | 22 | -223 to 268 |
| Ischemic heart disease | 174* | 79 to 289 | 2085* | 1607 to 2536 | 145 | -118 to 418 | -66* | -132 to -4.3 | 83 | -211 to 384 |
| Stroke | 26 | -38 to 104 | -34 | -379 to 324 | -19 | -154 to 122 | 140* | 99 to 183 | 118 | -39 to 282 |
| COPD | 51* | 37 to 68 | 219* | 152 to 283 | -323* | -563 to -116 | -61* | -114 to -12 | -412* | -678 to -177 |
| Number of physical impairment | 12 | -51 to 88 | 5114* | 4587 to 5641 | -270* | -501 to -61 | -5.8 | -65 to 51 | -288* | -560 to -31 |
| Constant | 374* | 171 to 597 | -4119* | -5155 to -3097 | 53 | -219 to 333 | 354* | 258 to 454 | 350* | 14 to 695 |
| $R^2$ | 0.02 | | 0.20 | | 0.21 | | 0.10 | | 0.21 | |
| Adjusted $R^2$ | 0.02 | | 0.20 | | 0.20 | | 0.09 | | 0.21 | |

* Significant at 95% level

**Table A3.16. Linear regression model of cost of dementia in each level of severity in Whole Sample**

| Variables | Cost of medical care | | Cost of social care | | Cost of informal care | | Cost of paid home care | | Total cost | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Observed coefficients | Bootstrapped 95% confidence interval | Observed coefficients | Bootstrapped 95% confidence interval | Observed coefficients | Bootstrapped 95% confidence interval | Observed coefficients | Bootstrapped 95% confidence interval | Observed coefficients | Bootstrapped 95% confidence interval |
| Rural area | -6 | -61 to 43 | 112 | -80 to 321 | 12 | -167 to 205 | 100* | 49 to 156 | 107 | -89 to 322 |
| Male | 94 | -2.9 to 190 | 1367* | 1030 to 1726 | 1131* | 828 to 1463 | 236* | 152 to 320 | 1460* | 1116 to 1835 |
| Age | -52 | -116 to 14 | 1061* | 651 to 1504 | 937* | 547 to 1384 | 124* | 52 to 208 | 1009* | 594 to 1464 |
| Education level of participants | | | | | | | | | | |
| No education | Reference | | Reference | | Reference | | Reference | | Reference | |
| Less than primary | 221* | 133 to 309 | 516* | 268 to 750 | 447* | 220 to 666 | 68* | 18 to 120 | 737* | 489 to 989 |
| Completed primary | 267* | 187 to 352 | 1018* | 714 to 1357 | 1017* | 713 to 1353 | 0.8 | -44 to 42 | 1285* | 976 to 1639 |
| Completed secondary or higher | 163* | 99 to 231 | 675* | 394 to 977 | 630* | 356 to 911 | 45* | 2.5 to 85 | 838* | 539 to 1149 |
| Marital status of participants | | | | | | | | | | |
| Single | Reference | | Reference | | Reference | | Reference | | Reference | |
| Married | 68 | -8.6 to 133 | 1785* | 1491 to 2097 | 1301* | 1061 to 1562 | 484* | 399 to 581 | 1853* | 1546 to 2161 |
| Divorced/widowed | -127* | -193 to -64 | 960* | 675 to 1275 | 871* | 610 to 1166 | 89* | 32 to 143 | 833* | 538 to 1149 |
| Living arrangement of participants | | | | | | | | | | |
| Living alone | Reference | | Reference | | Reference | | Reference | | Reference | |
| Living with spouse | -35 | -87 to 13 | 570* | 357 to 788 | 461* | 262 to 670 | 109* | 65 to 150 | 535* | 322 to 759 |
| Living with children | -19 | -83 to 58 | 429* | 199 to 646 | 346* | 132 to 547 | 83* | 34 to 128 | 410* | 175 to 645 |
| Living with other relatives | 17 | -24 to 59 | -142* | -289 to -4 | -91 | -226 to 34 | -51* | -86 to -17 | -125 | -276 to 13 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Living with children under 16 | -3.4* | -6.1 to -1 | 51* | 39 to 63 | 42* | 32 to 53 | 8.6* | 5.7 to 12 | 48* | 36 to 60 |
| Participants with any income | -4.8 | -49 to 40 | 76 | -108 to 260 | 58 | -115 to 235 | 19 | -21 to 55 | 72 | -125 to 263 |
| Number of assets in the family | -16 | -58 to 24 | 165 | -45 to 360 | 128 | -60 to 313 | 37 | -8.6 to 78 | 149 | -69 to 352 |
| Participant has private insurance | 52* | 3.9 to 108 | 235 | -16 to 477 | 146 | -77 to 370 | 89* | 23 to 153 | 287* | 31 to 539 |
| Male carers | 22 | -35 to 73 | -126 | -455 to 178 | -155 | -451 to 124 | 29 | -44 to 96 | -105 | -434 to 212 |
| Age of carers | 9.4 | -49 to 60 | -74 | -412 to 223 | -82 | -398 to 198 | 8.7 | -64 to 69 | -64 | -396 to 239 |
| Education level of carers | | | | | | | | | | |
| Less than primary | Reference | | Reference | | Reference | | Reference | | Reference | |
| Completed primary | -73* | -148 to -9.9 | 782* | 562 to 987 | 620* | 435 to 808 | 162* | 106 to 216 | 709* | 474 to 927 |
| Completed secondary | -44 | -120 to 18 | 671* | 484 to 863 | 526* | 354 to 695 | 145* | 90 to 196 | 627* | 420 to 824 |
| Completed tertiary | -76* | -159 to -4.4 | 763* | 510 to 1007 | 597* | 369 to 817 | 166* | 94 to 236 | 687* | 427 to 943 |
| Marital status of carers | | | | | | | | | | |
| Single | Reference | | Reference | | Reference | | Reference | | Reference | |
| Married | -22 | -69 to 24 | -91 | -249 to 58 | -32 | -178 to 108 | -59* | -94 to -27 | -113 | -281 to 54 |
| Divorced/widowed | 11 | -24 to 44 | -50 | -189 to 108 | -88 | -225 to 59 | 38* | 6.1 to 70 | -39 | -182 to 116 |
| Carers with paid work | 5.2 | -6.4 to 17 | 21 | -29 to 69 | -1.7 | -49 to 45 | 23* | 14 to 32 | 26 | -24 to 75 |
| Carers' relationship to participants | | | | | | | | | | |
| Spouse | Reference | | Reference | | Reference | | Reference | | Reference | |
| Children | 142* | 92 to 203 | -82 | -290 to 135 | -96 | -285 to 104 | 14 | -23 to 52 | 60 | -141 to 281 |
| Children in law or other relatives | -16 | -51 to 21 | -167* | -293 to -42 | -141* | -254 to -33 | -26 | -60 to 11 | -183* | -315 to -49 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Non-relative | 0.3 | -1.7 to 2.5 | -13* | -19 to -7.6 | -9.8* | -15 to -4.8 | -3.6* | -5.2 to -2 | -13* | -19 to -7 |
| Depression | 19 | -22 to 62 | -195* | -392 to -3.5 | -149 | -336 to 30 | -46* | -85 to -5.4 | -176 | -381 to 29 |
| Hypertension | 33 | -14 to 83 | -337* | -557 to -113 | -252* | -454 to -45 | -85* | -133 to -40 | -304* | -529 to -75 |
| Diabetes | 16 | -44 to 72 | -304* | -555 to -24 | -235 | -470 to 28 | -69* | -131 to -8.3 | -288* | -549 to -5.1 |
| Ischemic heart disease | -6.2 | -68 to 48 | 4.5 | -234 to 236 | 44 | -165 to 250 | -40 | -99 to 18 | -1.8 | -246 to 234 |
| Stroke | 3.1 | -80 to 86 | 18 | -259 to 292 | 90 | -162 to 347 | -72* | -135 to -7.7 | 21 | -264 to 301 |
| COPD | -2.3 | -34 to 31 | 118 | -24 to 268 | -22 | -146 to 116 | 140* | 99 to 182 | 116 | -30 to 274 |
| Number of physical impairment | -27 | -104 to 45 | -312* | -552 to -109 | -258* | -476 to -70 | -54* | -106 to -4.8 | -339* | -586 to -110 |
| Severity of dementia | | | | | | | | | | |
| No dementia | Reference | | Reference | | Reference | | Reference | | Reference | |
| Questionable | -10 | -97 to 71 | -222* | -458 to -0.9 | -222* | -445 to -10 | -0.1 | -59 to 56 | -233 | -479 to 14 |
| Mild | -53 | -139 to 20 | 389* | 89 to 706 | 36 | -207 to 301 | 353* | 259 to 447 | 336* | 11 to 666 |
| Moderate | 74 | -11 to 188 | 594* | 243 to 993 | 608* | 260 to 1000 | -13 | -79 to 65 | 107 | -89 to 322 |
| Severe | 30 | -8.1 to 63 | 11 | -107 to 136 | 13 | -101 to 127 | -2.1 | -32 to 27 | 1460* | 1116 to 1835 |
| Constant | 80* | 31 to 136 | 305* | 105 to 524 | 274* | 95 to 473 | 31 | -12 to 82 | 1009* | 594 to 1464 |
| $R^2$ | 0.03 | | 0.31 | | 0.30 | | 0.12 | | 0.30 | |
| Adjusted $R^2$ | 0.03 | | 0.31 | | 0.30 | | 0.12 | | 0.30 | |

* Significant at 95% level

**TableA4.1. Comparison between crude cost and attributable cost in 2008 international dollars**

| Type of cost | Cuba | Dominican Republic | Peru | Venezuela | Mexico | China | India | Whole sample |
|---|---|---|---|---|---|---|---|---|
| *Medical care* | | | | | | | | |
| Crude cost | 114 | 168 | 163 | 622 | 407 | 396 | 63 | 243 |
| Attributable cost | -5.5 | -44 | -42 | 296 | 16 | 148 | -29 | 12 |
| Increased cost by other conditions | 119.5 | 212 | 205 | 326 | 391 | 248 | 92 | 231 |
| *Social care* | | | | | | | | |
| Crude cost | 4400 | 5210 | 12235 | 7797 | 5969 | 11538 | 2408 | 6507 |
| Attributable cost | 3856 | 3847 | 10375 | 3201 | 4765 | 8540 | 1793 | 5114 |
| Increased cost by other conditions | 544 | 1363 | 1860 | 4596 | 1204 | 2998 | 615 | 1393 |
| *Informal care* | | | | | | | | |
| Crude cost | 4164 | 4591 | 10446 | 7232 | 5917 | 9778 | 2408 | 5883 |
| Attributable cost | 3658 | 3433 | 8870 | 2986 | 4720 | 7344 | 1793 | 4653 |
| Increased cost by other conditions | 506 | 1158 | 1576 | 4246 | 1197 | 2434 | 615 | 1230 |
| *Paid home care* | | | | | | | | |
| Crude cost | 236 | 619 | 1789 | 565 | 52 | 1760 | 0 | 624 |
| Attributable cost | 198 | 415 | 1505 | 215 | 45 | 1195 | - | 493 |
| Increased cost by other conditions | 38 | 204 | 284 | 350 | 7 | 565 | - | 131 |
| *Total cost* | | | | | | | | |
| Crude cost | 4514 | 5378 | 12397 | 8419 | 6376 | 11934 | 2471 | 6751 |
| Attributable cost | 3851 | 3804 | 10332 | 3497 | 4781 | 8687 | 1764 | 5164 |
| Increased cost by other conditions | 663 | 1574 | 2065 | 4922 | 1595 | 3247 | 707 | 1587 |
| Change rate of total cost | 15% | 29% | 17% | 58% | 25% | 27% | 29% | 24% |

**Table A4.2. Total crude cost of dementia in 2008 international dollars at the country level**

| | Cuba | Dominican Republic | Peru | Venezuela | Mexico | China | India |
|---|---|---|---|---|---|---|---|
| Population in 2008 (millions) | 11.2 | 9.9 | 27.9 | 27.9 | 107.7 | 1324.7 | 1149.3 |
| % of population aged 65+ | 12% | 6% | 6% | 5% | 6% | 8% | 5% |
| GDP per capita in 2008 (I$) | 4125 | 8138 | 8522 | 12665 | 14494 | 6136 | 2925 |
| Prevalence of dementia | 11.0% | 12.0% | 8.6% | 7.4% | 9.0% | 6.5% | 9.1% |
| Annual cost of care (I$ millions) | | | | | | | |
| Medical care | 17 | 12 | 23 | 64 | 237 | 2728 | 17 |
| Social care | 650 | 371 | 1761 | 805 | 3471 | 79479 | 650 |
| Informal care | 616 | 327 | 1504 | 747 | 3441 | 67355 | 616 |
| Paid home care | 35 | 44 | 258 | 58 | 30 | 12124 | 35 |
| Total cost (IS millions) | 667 | 383 | 1785 | 869 | 3708 | 82207 | 667 |
| Total cost as % of GDP | 1.4% | 0.5% | 0.8% | 0.2% | 0.2% | 1.0% | 0.4% |

**Table A5. Mean cost attributable to different levels of dementia severity in 2008 international dollars**

| Type of cost | Cuba | Dominican Republic | Peru | Venezuela | Mexico | China | India | Whole sample |
|---|---|---|---|---|---|---|---|---|
| Medical care | | | | | | | | |
| Questionable | 73 | -5.0 | 108 | 112 | 66 | -17 | 10 | 48* |
| Mild | 39 | -69* | 117 | -70 | 125 | -14 | 277 | 56 |
| Moderate | 38 | -141* | -44 | 2073 | -26 | 662 | -100 | 241 |
| Severe | 18 | -48 | -107 | -[1] | 367 | -150 | 308 | -4.4 |
| Social care | | | | | | | | |
| Questionable | 52 | 97 | 595* | 234 | 94 | 165 | 114 | 248* |
| Mild | 2007* | 1738* | 6169* | 1754* | 4002* | 6303* | 1872* | 3445* |
| Moderate | 7396* | 9923* | 18247* | 10194* | 10949* | 16169* | 8671* | 11878* |
| Severe | 9390* | 16711* | 23755* | -[1] | 28239* | 22591* | 12785* | 14054* |
| Informal care | | | | | | | | |
| Questionable | 60 | 84 | 573* | 220 | 106 | 201 | 114 | 238* |
| Mild | 1915* | 1436* | 5182* | 1644* | 4013* | 5234* | 1872* | 3074* |
| Moderate | 6714* | 8750* | 15418* | 10003* | 10659* | 13943* | 8671* | 10589* |
| Severe | 9118* | 14777* | 21153* | -[1] | 26775* | 18948* | 12785* | 12916* |
| Paid home care | | | | | | | | |
| Questionable | -8.4 | 13 | 22 | 14 | -11 | -35 | - | 10 |
| Mild | 92* | 302* | 987* | 110 | -12 | 1068* | - | 370* |
| Moderate | 682* | 1174* | 2829* | 191 | 290 | 2226* | - | 1289* |
| Severe | 272* | 1934* | 2602 | -[1] | 1464 | 3643* | - | 1139* |
| Total cost | | | | | | | | |
| Questionable | 125 | 92 | 703* | 346* | 160 | 149 | 125 | 297* |
| Mild | 2046* | 1669* | 6285* | 1685* | 4127* | 6288* | 2150* | 3500* |
| Moderate | 7434* | 9782* | 18203* | 12268* | 10923* | 16830* | 8571* | 12119* |
| Severe | 9409* | 16662* | 23648* | -[1] | 28606* | 22440* | 13093* | 14050* |

* Statistically significant at 95% level of confidence

[1] Results are omitted because dementia cases are too few.